MAGMATIC EVOLUTION OF THE SOUTHERN CENTINELA DISTRICT, NORTHERN CHILE: INSIGHTS FROM PGE GEOCHEMISTRY AND ZIRCON FERTILITY TOOLS

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November 2019

A thesis submitted for the degree of Master of Philosophy of

The Australian National University

Australian National University

DECLARATION

The work in this thesis is my own except where otherwise acknowledged.

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November 2019

Acknowledgements

I would like to express my gratitude to Ian Campbell, my supervisor, for his guidance, support, help, and patience, especially during the last couple of months when I was writing this thesis.

I would like to thank Hongda Hao for teaching me how to carry out the laboratory work necessary for the PGE analysis. Also, I am grateful to the whole PGE group, Yamila Cajal, Monika Misztela, Zhijie Huang and Hongda for helpful discussions and support, even when machines were broken, and labs were closed. Ziyi Zhu for being such a nice officemate, who with Bei Chen, helped me to prepare and analyse my zircons. Patrick Goodarzi and Laura Crisp, for their assistance and advice with ICP sessions.

I am also grateful to Shane Paxton who showed me how to prepare samples, how to crush them properly and separate zircon and apatite, prepare mounts and polishing samples. Dean Scott and David Clark for their assistance in the petrology lab. Peter Holden from the SHRIMP group for his support and advice during the oxygen isotopes analysis. Maree Coldrick and Virginia Riddle during my multiple scholarship applications. A special thanks for Josephine Magro, who always found time to assist, help and answer questions when advice was needed.

The people from Antofagasta Minerals: Jose Perello, Cocho Mpodozis, Paula Cornejo, Jaime Osorio, Ramon Aguirre, Pedro Apablaza, Jose Infanta, Leonardo Torres and their technical staff, for their helpful advice in early stages of this project, financial support during my fieldwork campaign, and providing access to the samples that were essential for this work.

This project was supported by ARC Discovery Project 17010340 to Ian Campbell. I would also thank the Chilean government scholarship CONICYT PFCHA/MAGISTER BECAS CHILE/2017 – 73180502 and the ANU postgraduate research support and supplementary scholarships that funded my studies and living expenses during my time at the Australian National University.

I am very grateful to the Society of Economic Geologists for their financial support through an GSF fellowship and travel support to attend the SEG2019 conference. The Geological Society of Australia for its support to attend AGCC2018 and Society for Geology Applied to Mineral Deposits for a fee waiver to attend SGA Glasgow 2019 conference. Attending at these conferences would have been not possible without RSES student research support funding.

To all my friends at RSES, the Chilean and Latin American community for all the good memories and happy moments during my stay in Canberra. The support of my family and friends that despite the distance and time between Australia and Chile was always present.

Finally, thanks to Yamila Cajal for her help with fieldwork, proofreading and for many useful discussions of results, but above all for being a loving and supportive partner.

Abstract

Copper is one of the most widely used metals in our society and it is essential for a broad range of applications. Globally, nearly three quarters of this metal is sourced from porphyry copper deposits. For this reason, is important to understand the processes that control their formation. Recent studies have shown that the platinum group elements (PGE) are sensitive indicators of sulphide saturation in evolving magma systems, which may be a key in controlling the fertility of Cu and Au in porphyritic deposits.

The Centinela District, located in northern Chile, is part of the middle Eocene to early Oligocene metallogenetic belt, which contains a number of renowned deposits including Chuquicamata and La Escondida. The district is host to at least ten identified mineralized porphyries, including both Cu-only, Cu-Au and sub-economic bodies. Here I present the results of whole-rock geochemistry (including the PGE) and zircon geochronology of the Polo Sur and Penacho Blanco porphyry copper deposits of the southern Centinela District, northern Chile.

This project aims to test the hypothesis that the timing of sulfide saturation, relative to volatile exsolution, is a key factor controlling the type (Cu or Cu-Au) and fertility of porphyry systems from the southern Centinela District. If a parent magma reaches sulfide saturation before volatile exsolution, an immiscible sulfide melt or solid will form, which will extract chalcophile metals, including Cu and Au, and may trap them at depth so they are unable to enter the volatile ore-forming phase, resulting in a barren system. In contrast, if the fraction of immiscible sulfide to form is small, the time difference between these events is short, or the magma does not become sulphide saturated, most of the metals will remain in the melt, and be available to enter the fluid phase to form an economic Cu or Cu-Au deposit.

The results from zircon and whole-rock geochemistry suggest that both deposits share a similar source and that the magmatic activity continued for ca. 5-6 Myr., shifting into more oxidizing conditions as it evolved. Platinum group elements geochemistry show contrasting results between the two deposits: Penacho Blanco deposit shows a steady decrease in Pd and Pt, whereas Polo Sur shows a scattered pattern when Pt or Pd are plotted against MgO. Although the samples span from dioritic to rhyodacitic compositions, it was not possible to establish the onset of sulfide saturation for these deposits. However, the data for Penacho Blanco suggest that sulphide saturation occurred before the MgO of the melt fell to 3.7 wt.%.

Zircon geochemistry indicates an increase in the fertility conditions as the deposits became younger, reaching a peak in the most fractionated samples from the TYC prospect. PGEs geochemistry allows the Penacho Blanco and Polo Sur deposits to be classified as Cu dominated porphyries. Although it is not possible to accurately establish the timing of the sulphide saturation for these deposits, the rate of depletion of Pd with decreasing MgO at Penacho Blanco suggests that the percentage sulphide precipitation was greater than Cadia (Au-Cu) but less than El Abra (Cu only), consistent with it being Cu-dominant deposits.

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Chapter 1: Introduction

1.1 Porphyry copper deposits

Copper is one of the most widely used metals in our society and it is essential in electronics, vehicles, telecommunications, electrical power generation and distribution systems, industrial and domestic piping, chemicals, currency and general infrastructure (Mudd and Jowitt, 2018, and references therein). The primary source of this metal are porphyry copper deposits which are the source of nearly three-quarters of world´s copper, a fifth of its gold and most of its molybdenum and rhenium (Sillitoe, 2010; Northey et al., 2014; Singer, 2017; Mudd and Jowitt, 2018). It is estimated that the demand for metals doubles every 20-30 years, but in contrast, the rate of discovery of economic deposits is falling (Schodde, 2017). For this reason, it is essential to reach a better understanding of the processes that can form porphyry copper deposits to help us to sustain the copper supply in future decades.

Porphyries are igneous rocks, usually of dioritic to granitic composition, that generally develops in magmatic belts above subduction zones (Sillitoe, 1973; Richards, 2003; Seedorff et al., 2005; Sillitoe, 2010; Audétat and Simon, 2012; Wilkinson, 2013). The magmas produced in this setting are usually of basaltic composition, hydrated and oxidised, that ascend to the base of the crust where they stagnate due to the contrast in density (Richards, 2003). These magmas evolve to more felsic compositions that are able to ascend to upper crustal levels where a decrease in temperature and pressure can lead to the exsolution of a volatile phase (Wilkinson, 2013, and references therein). These fluids can transport metals and have the potential to develop ore systems, known as porphyry copper deposits (Figure 1.1). However, not all porphyry systems are ore-bearing, and barren porphyries share similar features to fertile porphyries. Although there is a general understanding of the processes that lead to a mineralised system, the key factors that control the fertility or the potential to develop mineralized porphyry systems remain unclear (Wilkinson, 2013, and references therein).

The processes mentioned above, that are involved in the formation of a porphyry are common in a magmatic arc setting, which suggests that the processes required to form a deposit are not special. The formation of a porphyry Cu deposit results from a combination and optimisation of tectono-magmatic processes, which have a fundamental impact on the grade, size and location of deposits (Richards, 2003; Richards, 2005; Richards, 2013; Richards, 2015). It has

been suggested that the factors that may influence the development of porphyritic deposits include the initial metal content of the magma, the volume of magma, length of the magmatic activity (Audétat and Simon, 2012; Chelle-Michou et al., 2017; Chiaradia and Caricchi, 2017), the availability of metal in the melt at the moment of fluid exsolution (Wilkinson, 2013; Park et al., 2015), the transport and efficiency of ore precipitation from the hydrothermal fluids (Richards, 2003; Audétat and Simon, 2012; Wilkinson, 2013) and the behaviour of sulphur during the evolution of the magma (Audétat and Simon, 2012; Wilkinson, 2013; Richards, 2015). This work will investigate the role of sulphur in these system through PGE geochemistry.

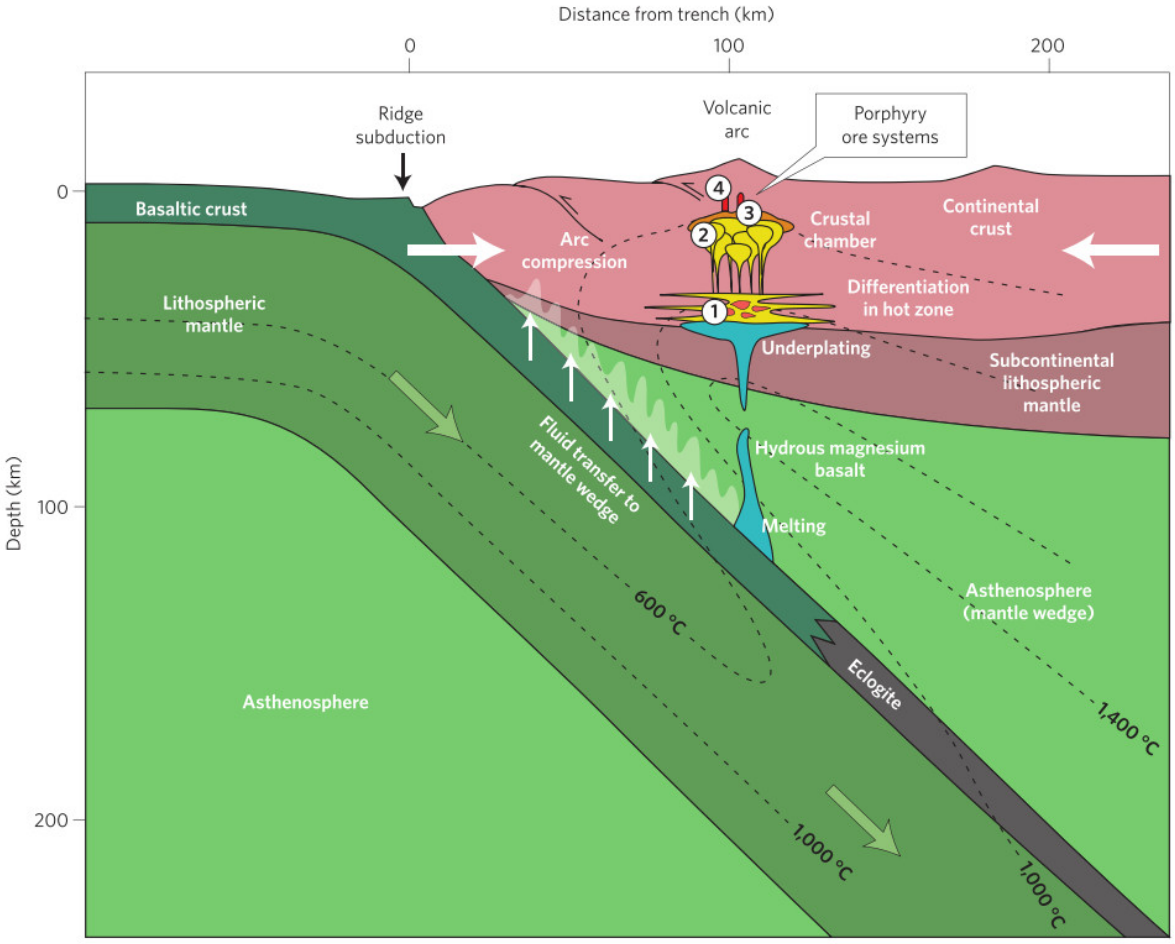

Figure 1.1: Schematic subduction figure after Wilkinson, 2013. The subducting slab is dehydrated releasing fluids into the mantle wedge. The addition of water to this system reduces the melting point, generating hydrous basaltic magmas. There are 4 key processes in the formation of porphyry copper deposits corresponding to the numbers indicated in the figure: 1.- Cyclic fractionation in deep crustal magma chambers; 2.- Magmatic sulphide saturation; 3.- Melt reduction and enhanced metal partitioning; 4.- Efficient precipitation at the deposit trap site. For more details, see Wilkinson, 2013.

Sulphur plays a main role in the formation of porphyry copper deposits since these are, ultimately, huge sulphur anomalies, that can contain up to 1 Gt of sulphur (Wilkinson, 2013; Cooke et al., 2014). Reduced magmas will tend to have sulphur dissolved as S^{2-}, which is less soluble in

melts than the oxidized S^{6+}(Jugo et al., 2010). A decrease of temperature, pressure or changes in the redox state can trigger sulphide saturation forming a sulfide rich melt or precipitation of a monosulphide solid solutions, that can kidnap the chalcophile elements from the magma that will not be available to enter in a hydrothermal fluid phase (Nadeau et al., 2010; Audétat and Simon, 2012; Yang, 2012).

1.2 Objectives

The main aim of this project is to test the hypothesis that the timing of sulphide saturation, relative to volatile saturation, is a key factor that controls the type (Cu, Cu-Au or Cu-Au-(Pd)) and fertility of porphyry systems from the southern part of Centinela District, Northern Chile. If a parent magma reaches sulphide saturation before volatile saturation, an immiscible sulphide melt will form, which could extract chalcophile metals, such as Cu, Au, and trap them at depth in an underlying magma chamber. Thus, they are unable to enter the volatile ore-forming phase and may result in a barren system. In contrast, if the sulphide saturation occurs close to the time of volatile saturation, most of the metals would be available to enter the fluid phase, and therefore an economic Cu or Cu-Au deposit can form.

Central Andes is a prime province that leads copper resources globally (Mudd and Jowitt, 2018). In particular, the orogen parallel belt of deposits formed during the middle Eocene to the early Oligocene, which extends from nearly 2500 km from southern Peru to northern Chile, is the biggest concentration of copper in the world (Sillitoe and Perelló, 2005). To address the aim of this project, Polo Sur and Penacho Blanco, two deposits from the Centinela district that belong to this belt were studied.

Secondary objectives of this work are to assess the effect of hydrothermal alteration on the bulk geochemistry of the samples, stablish the temporal context and magmatic evolution of the deposits and evaluate the use of zircon as fertility tool in these deposits. This is to assure that the studied samples are cogenetic and evolved from a similar source.

The fertility of magmas is a critical factor for the exploration of porphyry copper deposits, and therefore the results provided in this study will be important for countries that host this type of deposit such as Australia and Chile. Millions of dollars have been spent on exploration campaigns that lead to barren or low-grade non-economic systems. Thus, a better understanding of the influence of sulphide saturation on the Cu-Au concentration in evolving magma systems is

fundamental because of its potential application to discriminate between ore-bearing and barren systems at an early stage of exploration. This may be particularly useful in the exploration of new areas or to obtain some insight into the potentially deep targets where drilling costs are high.

1.3 Previous studies

Recent advances in platinum group elements (PGE) geochemistry, developed at the Research School of Earth Sciences (RSES), the Australian National University (ANU), allow the analysis of these elements at ultra-low concentrations (Park et al., 2012b). Therefore, it is possible to study rocks with low abundance of these elements, such as felsic suites, including the rock types associated with porphyry copper deposits. The PGE have shown to be sensitive indicators of sulphide saturation due to their high partition coefficient into sulphide melts (Keays, 1995; Mungall and Brenan, 2014), and because they are substantially less mobile in hydrothermal fluids than Cu and Au (Park et al., 2016).

Previous studies have successfully used PGE geochemistry to establish the fractionation point at which sulphide saturation occurs during the magmatic evolution. Park et al. (2013; 2015) studied the Pual Ridge and Niuatahi-Motutahi sequences, which fractionated from basalt to rhyolites. The PGE geochemistry revealed a steeply fall in PGE concentrations at the time of sulphide saturation (Figure 1.2). Recent studies have used PGE geochemistry to establish the timing of sulphide saturation in El Abra and Escondida Cu-only Porphyry in Northern Chile (Cu-Mo deposits are referred as Cu-only or Cu-dominant deposits in this work; Cocker et al., 2015; Hao et al., 2019) and in the Cu-Au Northparkes region of New South Wales, Australia (Hao et al., 2017). The latter study also included barren suites from the same region allowing the PGE geochemistry of barren suite to be contrasted with mineralized bodies. The results show that sulphide saturation occurred at earlier stages for the non-mineralized suites than for the Cu-Au porphyries, where sulphide saturation occurred slightly before volatile saturation. Moreover, the time difference between sulphide and volatile exsolution from the El Abra porphyry copper deposits was shown to be larger than that for Northparkes, which is consistent with the former being a Cu-only and the latter being a Cu-Au deposit (Table 1.1). Another study by Lowczak et al. (2018), on samples from the Forest Reef volcanic suite in south-eastern Australia, found that the sulphide saturation in this suite was at an early stage, however, the amount of sulphide extracted from the magma was not enough to significantly reduce the Cu-Au endowment of the magma that gave rise to the Cadia Au-Cu deposit.

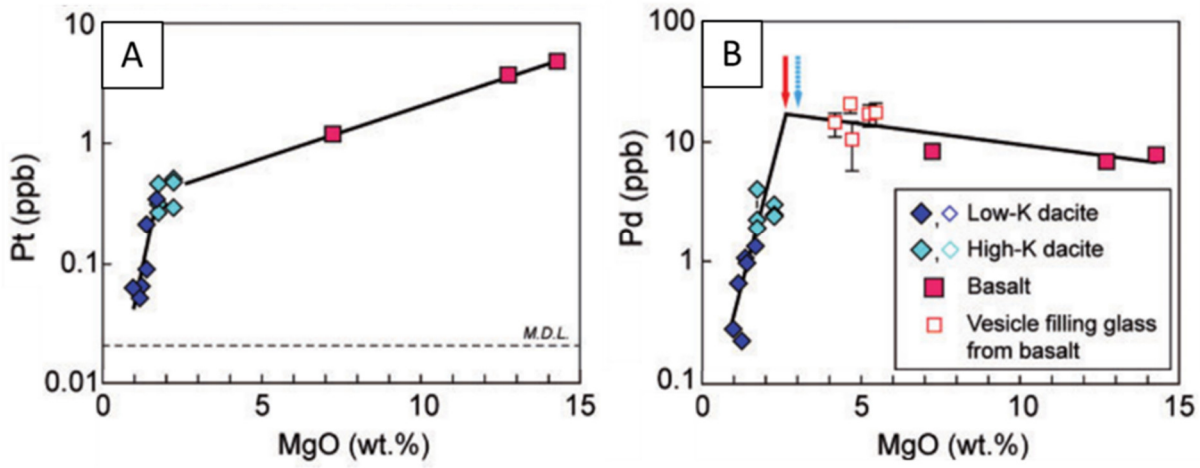

Figure 1.2: Pt vs MgO (A) and Pd vs MgO (B) binary diagrams for the Niuatahi-Motutahi sequences modified from Park et al. (2015). It is notable that the palladium (Pd) is concentrated in the melt, but once a sulphide melt is exsolved, it decreases quickly (Park et al., 2013a).

A recent study by Park et al. (2019), compiled the studies mentioned above and included new data from Chuquicamata deposit in Northern Chile, Grasberg in Indonesia, the Rachaite barren series from Argentina, Ryoke and Sanyo Ilmenite series and Sanin magnetite series granitoids from Japan. From this compilation, they determined a chalcophile element fertility indicator using the ratios of Pd/MgO and Pd/Pt (Figure 1.3). The Pd/MgO ratio is a measure of the content of Pd that is normalized by the MgO in order to correct for variations caused by fractional crystallization. The Pd/Pt ratio increases with the amount of fractional crystallization before sulphide saturation. This is because Pd typically behaves as an incompatible element whereas Pt can be incorporated into Pt-Fe alloys before sulphide saturation. Once the magma saturates in sulphide, the Pd/Pt ratio falls because Pd is more compatible than Pt in sulphide. This diagram successfully discriminates between different types of porphyries and barren suites.

Table 1.1: Summary of the onset of sulphide saturation and volatile saturation for previous works. Notice that volatile saturation does not apply to barren suites. VS= Volatile saturation: SS = Sulphide saturation

Location	VS (MgO wt.%)	SS (MgO wt.%)	Timing (SS-VS) (MgO wt.%)	Type	Reference
Northparkes Porphyries	1	1.2	0.2	Cu-Au	Hao et al. 2017
Goonumbla Volcanics		6.79		Barren suite	Hao et al. 2017
Wombin Volcanics		4.17		Barren suite	Hao et al. 2017
El Abra Porphyry	1.5	2.5	1	Cu-only	Cocker et al. 2015
Cadia (Forest Reef)	2.9	6.8	3.9	Au-Cu	Lowczak et al. 2018
Pual Ridge		3		Barren suite	Park et al. 2013
Niuatahi–Motutahi	1.69	2.7	1.01	Cu-Au	Park et al. 2015

There is still debate as to the role that sulphides play in the evolution of magmatic systems. Some studies suggest that sulphides represent an intermediate storage media for metals, that are later reabsorbed during replenishment by mafic magmas or by the decompression of the magma, which can destabilize sulphides releasing the metals back into the melt (Audétat and Simon, 2012; Wilkinson, 2013; Nadeau et al., 2010). However, others hold the view that sulphide melts/solids can be exsolved from magmas, sequestering chalcophiles metals at depth, so that they are not able to enter into the fluid during the ore-forming phase (Audétat and Simon, 2012; Wilkinson, 2013).

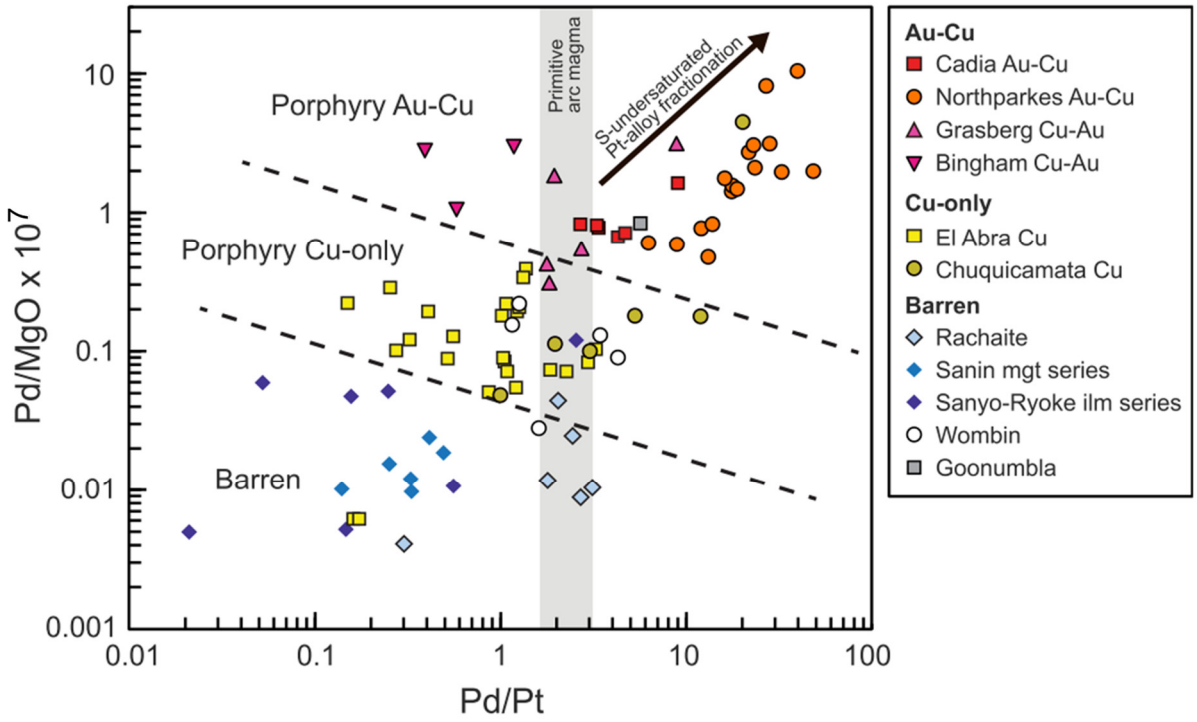

Figure 1.3: Chalcophile element fertility indicator diagram from Park et al. (2019).

The role of sulphide is unclear (Audétat and Simon, 2012, and references therein) because hydrothermal alteration often destroys the magmatic sulphides and, as a consequence, the geochemical signature of magmatic sulphides is overprinted. Furthermore, primary sulphides and melt inclusions in phenocrysts are commonly destroyed during alteration. Therefore, a study of PGE geochemistry provides a tool to better understand the behaviour of sulphides in natural porphyry systems and a method of testing whether there is a relationship between their behaviour and the metal budget, and development of porphyry copper deposits when magmatic fingerprints are not available.

1.4 Cases of study: Polo Sur and Penacho Blanco.

1.4.1 Regional geology of Centinela District

The Centinela District, located in northern Chile, is part of the middle Eocene to the early Oligocene metallogenetic belt, which includes some renowned deposits like Chuquicamata and La Escondida (Sillitoe and Perelló, 2005). It is a NE trend block, approximately 40 km in length and 25 km width, limited by the coastal cordillera to the West and the Domeyko Cordillera to the East. It is associated with the north ending tip of the Sierra de Varas Fault, part of the Domeyko Fault System which is spatially associated with most of the mineralization in this belt (Perelló et al., 2010; Mpodozis and Cornejo, 2012).

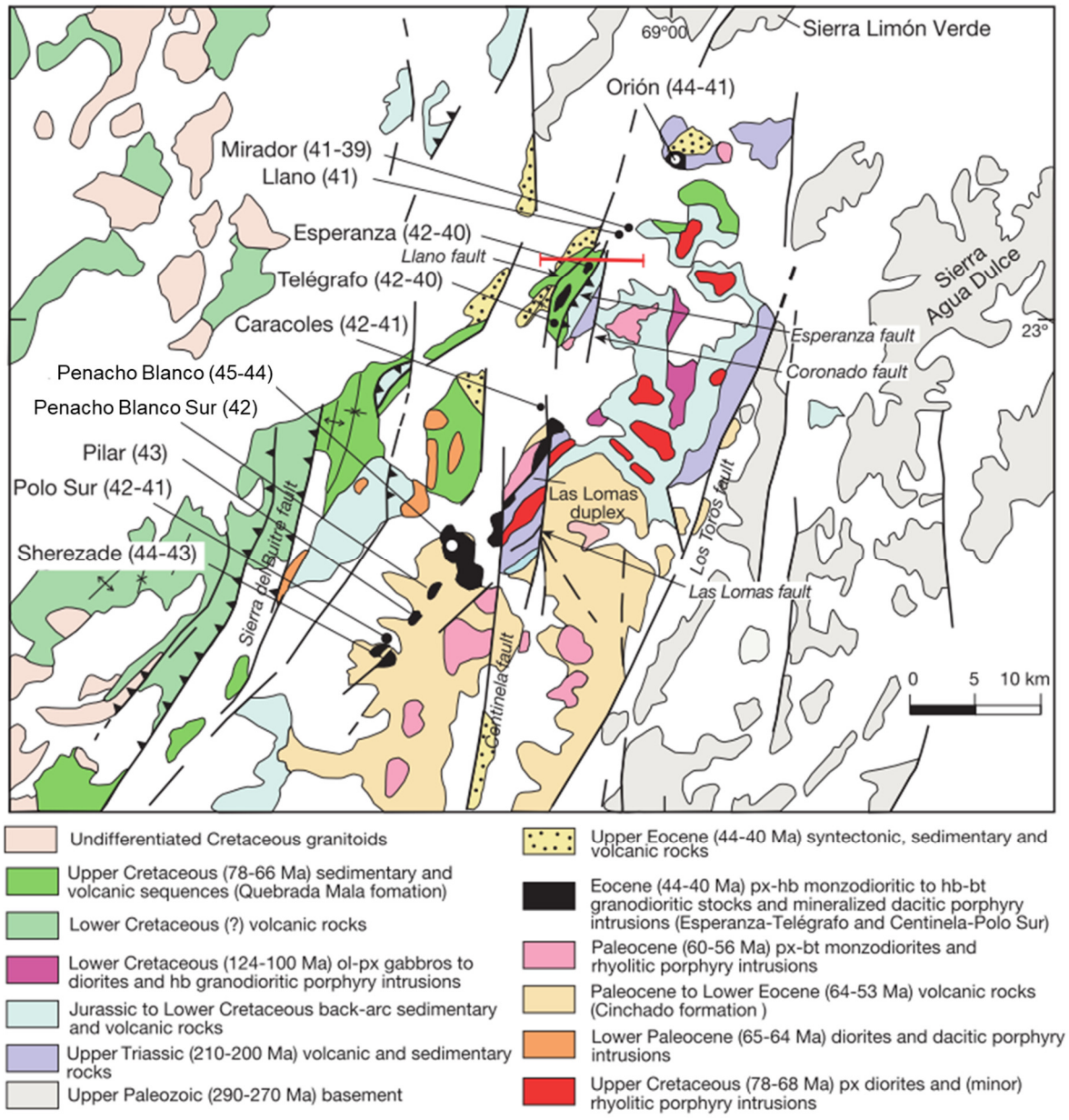

Figure 1.4: Regional geological map of the Centinela District area. After Mpodozis and Cornejo, 2012.

The Centinela District is characterized by a protracted history of magmatic and volcanic activity of almost 80 Ma. The oldest plutonic rocks are gabbros and quartz diorites from the early Cretaceous. The late Cretaceous is represented by volcanic and intrusive events of pyroxene diorites, rhyolitic porphyries and flow domes. The Palaeocene to early Eocene is characterized by volcanic activity, which includes stratovolcanoes and small collapse calderas, that are contemporaneous with the emplacement of epizonal dioritic to monzodioritic intrusions. The mid-Eocene to early Oligocene magmatism is related to the development of porphyry copper deposits and mineralization at the Centinela District, which corresponds to a set of discrete intrusive complexes with a NNE trend (Figure 1.4; Mpodozis and Cornejo, 2012).

The district is host to at least seven mineralized porphyries, including both Cu-only and Cu-Au deposits, and low grade to barren porphyries (Figure 1.4), that have accounted for nearly 24.8 Mt of refined copper to 2017 (Antofagasta Minerals PLC, 2017). Encuentro (41 Ma) and Esperanza (42 Ma) are currently being mined as well as two exotic deposits: Tesoro and Mirador. The porphyries formed between 39 and 45 Ma, during the Incaic compressive tectonic event (Perelló et al., 2010; Mpodozis and Cornejo, 2012). These features make this district a perfect natural laboratory to test and contrast the timing of sulphide saturation, relative to volatile saturation, among different mineralized bodies.

1.4.2 Geology of Penacho Blanco, Polo Sur deposits and TYC area.

The Penacho Blanco (formerly Centinela) and Polo Sur deposits account for the 25% of the resources available in the district, with 1.25 Mt of refined copper contained in the former and 5.14 Mt in the latter (Perelló et al., 2010; Antofagasta Minerals PLC, 2017). These are the oldest deposits in the district, located nearly 10 km of distance between each other, with ages ranging from 45 to 44 and 42 to 41 Ma respectively, and both classified as Cu ± Au ± (Mo) porphyries (Figure 1.4; Perelló et al., 2010; Mpodozis and Cornejo, 2012).

Penacho Blanco comprises subvertical cylindrical bodies of granodioritic composition hosted in volcanic rocks and a pre-mineralization diorite. Its alteration pattern is concentric with a central potassic zone overprinted by sericitic alteration. The main hypogene mineralization is dominated by chalcopyrite with an important and well-developed blanket of secondary sulphides that include chalcocite and covellite. The oxidation zone is not well developed and marginal in grade (Perelló et al., 2010).

The oldest bodies in the Penacho Blanco area are associated with a 43 to 44 Ma biotite-pyroxene diorite with minor quartz and a 43.6 ± 0.8 Ma diorite with megacrysts of amphibole. This intrusive suite generates a zone of contact metamorphism in the adjacent volcanic dacites and tuffaceous host rocks. The deposit is located at the border of these diorites and is associated with repeated porphyritic pulses that range from dioritic to dacitic in composition with phenocryst of plagioclase, amphibole and biotite. These bodies were emplaced at the same time as the diorites, between approximately 44-43 Ma (Torres, et al., 2013).

Polo Sur porphyries are irregular to cylindrical bodies of dacitic composition emplaced in Palaeocene to early Eocene volcanic rocks. Its alteration zonation is concentric with a potassic core overprinted by sericite that grades into propylitic alteration laterally and it is capped by an advanced argillic lithocap. The sulphide mineralization is mainly chalcopyrite with minor bornite and, in contrast with Penacho Blanco, the oxidation zone in Polo Sur is well developed (Perelló et al., 2010).

Three magmatic pulses identified in Polo Sur have been informally named the Polo Sur Intrusive Complex. They range from dioritic to dacitic in composition and from 43.73 to 40.74 Ma in age. The oldest pulse is associated with intrusions of dioritic to quartz-dioritic composition and characterised by an early potassic (biotite dominated) and sericite-chlorite alteration. This pulse is considered as the precursor of mineralization. The subsequent pulse is the main mineralizing event associated with potassic alteration, which includes biotite, potassic feldspar and sericite-chlorite, that over-prints the first pulse of alteration and mineralization. It is associated with granodioritic porphyries and related to the development of igneous and hydrothermal breccias. The last pulse consists of dacitic porphyries associated with a poorly development of potassic and sericite-chlorite alteration (Alfaro et al., 2013).

Rhyodacitic samples from TYC (Telégrafo y Caracoles) area, which have been dated at 39-38 Ma, were also included in this study as the youngest identified igneous rocks in the study area. These samples were encountered during deep drilling (>1km depth) of the mineralized Cu-porphyries and are located near the middle of the district (Figure 1.5, the northernmost samples).

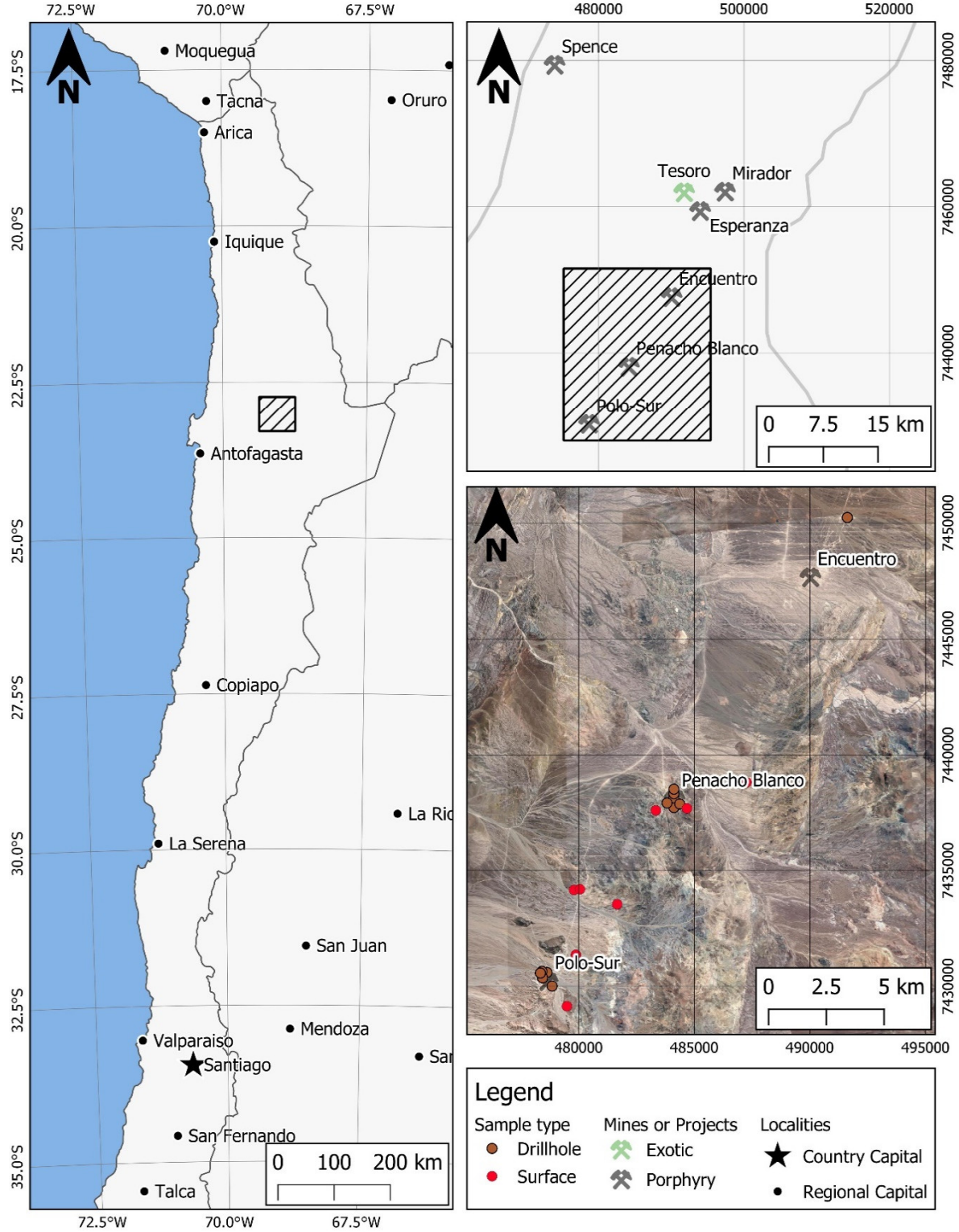

Figure 1.5: Map with the location of Centinela District and ubication of samples.

1.5 Methodology and samples

1.5.1 Sample collection

During November 2017, a sampling campaign was undertaken with the support of Antofagasta Minerals. Forty-three, one to five kilograms samples were collected of which seventeen were from the surface and twenty-six from drill-cores from the Polo Sur, Penacho Blanco deposits and TYC deep porphyries (Figure 1.5). The selection criteria were i) low alteration and unmineralized samples were preferred, ii) compositional range, with the objective to cover the widest possible range of compositions, and iii) age, to ensure that the samples correspond to the magmatic event being studied. This resulted in a collection of thirty samples directly related to deposits together with thirteen from barren intrusions and volcanic rocks from the Palaeocene. Sampling was restricted to the mineralized porphyries. Non-mineralized suites will be analysed in future studies.

1.5.2 Thin and thick sections preparation

Thins sections and polished thick sections were used for petrographic characterization and to search for potential magmatic sulphides and melt inclusions. This may be difficult in the more evolved samples since they might be completely overprinted by the later hydrothermal sulphides and alteration, which complicates the identification of magmatic sulphides and inclusions in primary silicate minerals.

1.5.3 Sample preparation

Approximately, 1 kg of the least altered part of each sample was separated from veinlets and alteration halos using a diamond saw and a diamond lap. This was done to reduce the effects of hydrothermal alteration on the geochemistry.

Samples for whole-rock geochemistry and mineral separation were first crushed in a jaw crusher and split into two fractions. Rock chips for the fraction selected for geochemistry were washed and dried before being ground in an in-house case-hardened soft iron mill until grit-free. Samples with more than a 1% of sulphides were heated at 450 °C for 2.5 to 3 hours in order to oxidize the sulphides (Reimers and Hjelmstad, 1987) and avoid possible reactions with the platinum-ware used for sample fusion. Twenty grams of sample were sent for X-ray Fluorescence (XRF) analysis.

Samples for mineral separation were sieved into three fractions. The fraction with grains larger than 1/2 inch was used for milling. The fraction between 1/2 to 3/8 inch was saved as a backup and the fraction smaller than 3/8 inch was disposed in order to avoid any contamination, which may be a factor for the finest fraction. Rock chips were washed, dried and then crushed in a tungsten carbide mill for nearly 15 seconds. This allowed the mineral grains to be liberated but not completely crushed. Samples were then sieved with a 250 μm nylon screen that was changed between samples in order to avoid the contamination. The portion that did not cross the sieve was crushed and sieved again until the whole sample passed through the sieve. Samples were then deslimed before being dried. Zircons and apatites were separated from thirteen representative samples for further analyses using a combination of magnetic separators and heavy liquids with densities of 2.96 and 3.3 g/cm^3.

1.5.4 Major and trace elements

Major elements analyses were carried out by XRF on glasses at Intertek external Laboratories in Perth, Western Australia. The glass beads were returned and mounted in epoxy resin and prepared for analyses by LA-ICP-MS at the Research School of Earth Sciences, ANU. The analytical system comprises a Lambda Physic Complex 110 excimer laser (k = 193 mm), an ANU-designed HelEx ablation cell and an Agilent 7700x ICP-MS. The main ore-related elements found in porphyries system, such as Cu, Mo, As and Te, together with high-field-strength elements (HFSE), large-ion lithophile elements (LILE) and rare earth elements (REE) were analysed for geochemical characterization. Five spots were analysed per sample and the values averaged. Each measurement consisted of 25 seconds of background measurement and 40 seconds of sample ablation. NIST 610 and NIST 612 (Jochum et al., 2011) glasses were measured as primary standards after every 10 analyses and BCR-2G (USGS) glass as quality control after every 30 unknows. The measured data were processed using Iolite software with Ca^{43} as an internal standard (Paton et al., 2011).

1.5.5 PGE, Re and Au geochemistry

Twenty-three samples and eighteen duplicates, which range from the most mafic (highest MgO content) to the most felsic end member (lowest MgO), including mineralized porphyries, were analysed for PGE by the isotopic dilution using the Ni-Sulphide Fire assay method of Park

et al. (2012b). Five grams of sample were mixed with sulphur, nickel and sodium borax in a ratio 20:1:2:20, and then spiked with a solution enriched in ^{99}Ru, ^{105}Pd, ^{185}Re, ^{191}Ir and ^{195}Pt, the amount added depending on the PGE concentration expected in the sample (approximately 0.03 ml for felsic compositions).

The spiked samples were placed in the inner crucible of a double porcelain Coors™ crucible and flour added in the outer crucible to act as a reducing agent. The samples were dried in the crucibles at 100 °C for one hour before being placed in a furnace at more than 1100 °C for 30 minutes. Reducing conditions during the fusion were maintained by flowing nitrogen gas (N_2) through the furnace at a flow rate of 0.03 m^3/min.

Once samples were quenched, NiS beads were collected from the glass and dissolved in 150 ml of distilled 6 mol hydrochloric acid. Samples were then vacuum filtered using a Millipore cellulose membrane (0.45 μm) and the filter digested in closed vessels with 4 ml of aqua regia at 120 °C. After the complete dissolution, the solution was evaporated down to approximately 100 pL, then diluted in 4 ml of distilled 2% HNO_3, and refluxed in closed vessels for 2 hours at 100 °C. The final solution was centrifuged prior to analysis in an Agilent 7700x ICP-MS.

The analysed data were processed and corrected for background signal, potential molecular interferences from Ni, Cu, Zn, Co, Hf, Mo, Zr and Ta argides or oxides, and for isotopic mass fractionation. This was done using in special internal standard solutions prepared for this purpose and PGE standards.

The concentration of each element was calculated using the isotopic dilution equation:

$$\frac{B_{sa}}{B_{sp}} = \frac{\left(\frac{A}{B}\right)_{mix} - \left(\frac{A}{B}\right)_{sp}}{\left(\frac{A}{B}\right)_{sa} - \left(\frac{A}{B}\right)_{sp}}$$

where B_{sa} and B_{sp} the number of atoms of the reference isotope in the sample and spike respectively, and $\left(\frac{A}{B}\right)_{mix}$, $\left(\frac{A}{B}\right)_{sa}$ and $\left(\frac{A}{B}\right)_{sp}$ are the ratio of reference isotope in the sample, spiked-sample and spike respectively (Stracke et al., 2014).

The abundances of monoisotopic Rh and Au were calculated by the method described by Meisel et al. (2003) and Park et al. (2012a). They used the ratio of ^{103}Rh to ^{106}Pd to determine the concentration of Rh based on the assumption that the loss of each element was similar during the analytical procedure. Similarly, the ratio of ^{197}Au to ^{194}Pt was used for the calculation of Au.

Table 1.2 shows the results for sample-free procedural blanks that consisted of 10g of sodium borate, 0.5g of Ni powder and 0.25g of sulphur. Some values reported in Table 1.1, with anomalous results, were considered as outliers and excluded from the average. The results for six procedural blanks are 1.1 ± 0.4 ppt for Ir, 1.6 ± 1.0 ppt for Ru, 2.1 ± 1.0 ppt for Rh, 16.1 ± 4.5 ppt for Pd, 21.4 ± 2.7 ppt for Pt, 18.9 ± 2.1 ppt for Re, 3.1 ± 5.0 ppt for Au. The detection limits were taken to be three standard deviations of the procedural blanks (Heumann, 1992), which are 12 ppt for Ir, 2.9 ppt for Ru, 2.9 ppt for Rh, 13.5 ppt for Pt, 8 ppt for Pd, 6.4 ppt for Re, and 7.5 ppt for Au.

Table 1.2: Procedural blanks values for PGEs.

Sample	Ir (ppb)	Ru (ppb)	Rh (ppb)	Pt (ppb)	Pd (ppb)	Re (ppb)	Au (ppb)
Blank							
#1	0.0007	0.0018	0.0006	0.060*	0.018	0.018	0.0007
#2	0.0008	0.0024	0.0027	0.012	0.024	0.018	0.0060
#3	0.0228*	0.0028	0.0028	0.019	0.022	0.016	0.0010
#4	0.0016	0.0001	0.0031	0.022	0.021	0.019	0.0023
#5	0.0101*	0.0018	0.0017	0.014	0.025	0.023	0.0196*
#6	0.0014	0.0008	0.0013	0.013	0.019	0.019	0.0055
Average	**0.0011**	**0.0016**	**0.0021**	**0.016**	**0.021**	**0.019**	**0.003**
SD	**±0.0004**	**±0.001**	**±0.001**	**±0.005**	**±0.0027**	**±0.002**	**±0.005**

*Value not considered in the average

SD = Standard Deviation

The TDB-1 standard (Tremblay Lake Diabase, Canada, Govindaraju, 1994) was analysed in each analytical session to assess the precision and accuracy of the analysis. The values of the six standards are summarised in Table 1.3. The relative standard deviation (RSD) is lower than 13% for all the elements except for Rh and Au, which have RSD of nearly 25% and 35%, respectively. The results are in agreement with previously published data (see Table 1.3) except for Au, which yields values that are lower than the published data. However, the available data for Au (GeoReM database; Jochum et al., 2005) range between 3.9 and 8.4 ppb suggesting that this standard might not be homogeneous for Au. Furthermore, one of the analyses of this work yield values of nearly 67 ppb, ten times higher than the certified values, which suggest the presence of nuggets.

Table 1.3: TDB -1 values for this research and reference values from previous works. All uncertainties are two standard deviations.

Sample	Ir (ppb)		Ru (ppb)		Rh (ppb)		Pt (ppb)		Pd (ppb)		Re (ppb)		Au (ppb)	
TDB-1														
#1	0.07		0.16		0.20		4.2		18.7		0.61		67.7*	
#2	0.06		0.17		0.39		4.1		21.7		0.61		3.2	
#3	0.08		0.19		0.41		4.7		22.9		0.72		1.9	
#4	0.08		0.18		0.38		4.6		21.7		0.66		1.2	
#5	0.07		0.19		0.29		4.5		26.4		0.78		2.2	
#6	0.07		0.17		0.28		4.5		23.6		0.64		1.6	
Average	**0.07**	**±0.02**	**0.18**	**±0.02**	**0.33**	**±0.16**	**4.4**	**±0.5**	**22.5**	**±5.1**	**0.67**	**±0.1**	**2.0**	**±1.5**
a Lab Mean	0.06	±0.03	0.17	±0.1	0.39	±0.1	4.4	±0.7	22.5	±5.1	0.72	±0.2	4.3^	±3.5
b M&M (n = 7)	0.08	±0.02	0.20	±0.02	0.47	±0.08	5.0	±0.3	24.3	±3.4	0.79	±0.04		
d GeoReM database. (n = 33)													5.9	±2
e CANMET values	0.15		0.30		0.70		5.8	±1.1	22.4	±1.4			6.3	±1

*Value not included in Average. ^ Average includes four values from Hao et al. (2017).

a Includes all published data analysed at ANU by Ni-S fire assay digestion and ID-ICP-MS. The data is from: Park et al., 2012a; Park et al., 2012b; Park et al., 2013a; Park et al., 2013b; Park et al., 2015; Cocker et al., 2015; Park et al., 2016; Hao et al., 2017; Lowczak et al., 2018; Park et al., 2019 and Hao et al., 2019. The data includes four values for gold, 44 for Ru, 47 for Re and 49 for all other PGEs.

b Average values from Meisel and Moser (2004), high-pressure asher (HPA) digestion ID-ICP-MS (n = 7).

c GeoReM database values for gold (n = 33, Jochum et al., 2005).

d Certified CANMET Values.

1.5.6 Zircon analyses

Zircons grains were selected and annealed at 900 °C in Coors® ceramic crucibles for 48 hours to eliminate the alpha-dose induced differences in ablation characteristics, which reduce uncertainties when measuring $^{206}Pb/^{238}U$ and some trace elements (e.g. Ti, Allen and Campbell, 2012; Marillo-Sialer et al., 2014; Solari et al., 2015; Ver Hoeve et al., 2018). Between seventy and one hundred annealed zircons were mounted in epoxy resin, polished so that approximately half of the grains were exposed and finally polished with 1 μm diamond paste. The zircons were then imaged in transmitted and reflected light, and by cathodoluminescence to identify zonation patterns, inherited cores and inclusions.

Ten to fifteen zircons for each sample were analysed on the sensitive high-resolution ion microprobe-stable isotope (SHRIMP-SI) using a ca. 25 μm spot to determine the $\delta^{18}O_{VSMOW}$ (‰). The Mud-Tank zircon was used as primary standard to correct for instrumental mass fractionation, assuming a value of 5.03 ± 0.2‰ (2σ), and the R33 zircon was used as secondary standard (Valley, 2003). Each season started with calibration of the instrument using several standard zircons. Unknown samples were run in a cycle of nine that included two Mud-Tank and two R33 standards. The analysis was carried out in two seasons with a reproducibility of 5.03 ± 0.62 ‰ (n=36, 2σ) for the first session and 5.03 ± 0.84 ‰ (n=12, 2σ) for the second. R33 zircons yielded values of 5.34

± 0.38 ‰ (n =14, 2σ) for the first season and 5.38 ± 0.58 ‰ (n =9, 2σ) for second season which lies within uncertainty of the reference value of 5.55 ± 0.08‰ (2σ, Valley, 2003).

Nearly fifty zircons crystals per sample were then analysed by laser ablation inductively coupled plasma mass (LA-ICP-MS) to determine the abundances of REE (^{139}La, ^{140}Ce, ^{141}Pr, ^{146}Nd, ^{147}Sm, ^{153}Eu, ^{157}Gd, ^{163}Dy, ^{172}Yb, ^{175}Lu), ^{29}Si, ^{31}P, ^{49}Ti, ^{91}Zr, ^{206}Pb, ^{207}Pb, ^{208}Pb, ^{232}Th, ^{238}U. Each measurement consisted of 35 seconds of background and 45 seconds of ablation with a spot size of 28 μm. Zircons analysed for oxygen isotopes were ablated in the same position that was used for the oxygen measurement. Temora-II and R33 were used as standards for analyses of U-Pb age, and NIST610 and NIST 612 as standards for trace element compositions. In a normal season, standards were analysed twice every 30 measurements and once every 10 unknowns. Dwell times of 0.04 s were used for ^{139}La, 0.03 s for ^{49}Ti, ^{206}Pb, ^{207}Pb, ^{208}Pb, ^{232}Th, ^{238}U, and 0.01 s for the remaining elements. The data were reduced using Iolite software (Paton et al., 2011) and the U-Pb ages and trace element concentrations were calculated using ^{29}Si as an internal standard, assuming a stoichiometric value of 15.32% Si in zircon.

Cathodoluminescence and transmitted light images were used to identify zircons with rutile or apatite inclusions, and these were avoided during LA-ICP-MS analyses. Anomalous peaks of P, La or Ti were excluded during data reduction. Analyses with a bulk concentration of Ti, P or La higher than 30, 2000 and 1 ppm, respectively, were observed closely for inclusions and rejected were appropriate. Zircons were accepted as concordant if the ratio of ^{206}Pb/^{238}U to ^{207}Pb/^{235}U age was 1 ± 0.1 with 2σ uncertainty. Different zircon populations were distinguished using a combination of cumulative probability (Campbell et al., 2006) and quantile-quantile plots. Steps or changes in slope on the cumulative probability plots are indicative of different populations. Zircons with ages younger than the main population are interpreted to have undergone lead loss whereas older zircons are interpreted to be antecrystic or inherited zircons.

Concordia ages and weighted means for the ^{206}Pb/^{238}U ages were calculated using IsoplotR (Ludwig, 2012; Vermeesch, 2018) after correcting the for common lead using the ^{207}Pb method, which assumes that zircons that were concordant (Williams, 1997; Ireland and Williams, 2003), a reasonable assumption for zircons that are <100 Myr. Zircons were considered concordant if the ratio between the ^{206}Pb/^{238}U and the ^{207}Pb/^{235}U age was within 1 ± 0.1 within 2σ uncertainties. Zircons that might have undergone Pb loss or are inherited were not considered in the age calculation. Temora2 was used as a primary standard (n = 93) and R33 was used as secondary standard to evaluate the precision and accuracy. The R33 zircon yielded a weighted mean ^{206}Pb/^{238}U age of 419.94 ± 0.87 (n = 95/98, three rejected analyses) that lies within 2SE (standard

error) from the ID-TIMS (Isotopic Dilution Thermal Ionization mass spectrometry) reported value of 419.26 ± 0.39 Ma (Black et al., 2004).

Zircon trace element data and whole-rock geochemistry data were used to estimate the Ce^{4+}/Ce^{3+} ratio according to the method of Ballard et al., 2002, Ti-in-zircon temperature using the method of Watson and Harrison (2006) (see also Hayden and Watson, 2007; Ferry and Watson, 2007) and the oxygen fugacities of the melt were estimated using the Ce-in-zircon oxygen barometer of Smythe and Brenan, (2016).

The results from the Penacho Blanco and Polo Sur porphyries in Centinela District will be compared with those from El Abra Porphyry copper deposit (Cocker et al., 2015), Northparkes Region (Hao et al., 2017), and Cadia (Forest Reef volcanics, Lowczak et al., 2018).

1.6 Thesis Structure

This thesis will be divided into four chapters, consisting of an introduction, results, discussion and conclusion, plus two appendices that compile the data used in this work. The second chapter reports the results and is divided into four main sections. The first section shows the results of zircon geochronology. The second section shows the petrography of the studied samples, followed by the third section which details the whole-rock geochemistry, including the Platinum group geochemistry. The final section shows relevant results for zircon geochemistry, including oxygen isotopes and calculated variables, such as Ti in Zr temperature, Eu anomalies and Ce^{4+}/Ce^{3+} Ratios. The discussion examines these results from three main points of view. The first is the effect of hydrothermal alteration on the geochemistry of the studied samples. The second part discusses platinum group geochemistry and its use a fertility indicator. The third part describes the magmatic evolution from a district-scale, based on the interpretation of the results. Finally, the conclusion summarises the main points of this thesis.

Chapter 2: Results: Geochronology, Petrography and Whole Rock Geochemistry

2.1 Introduction

This chapter will present the results of the geochronology, petrography, whole-rock and zircon geochemistry. It is divided into four parts. The first section will consider the U-Pb geochronology of zircons from selected samples to establish the temporal setting for each area. The second will describe the overall petrography of the samples from each deposit. The third part will present the results of whole-rock geochemistry for major elements, trace elements and platinum group elements. Finally, results from zircon geochemistry, including Ti-in-Zr thermometry and Ce^{4+}/Ce^{3+} ratios, are presented.

2.2 Geochronology

Zircons from all the samples (656 individual grains) are euhedral crystals and are colourless to pinkish. Their sizes range from approximately 30 microns up to ~ 500 microns, most have oscillatory zoning that can be seen in cathodoluminescence imaging (Figure 2.1).

Zircons with Ti-P inclusions, that were discordant or not part of the main population were not considered for the age calculation (See section 1.5.6 for criteria).

In general, more than a hundred of zircons were found in each sample. However, samples 353384 and 353385 had less than fifty grains after the mineral separation, from which only five and eight zircons, respectively, were suitable for dating.

The results for the 13 dated samples are summarised in Table 2.1 and presented as probability plots and Wetherill concordia diagrams in Figure 2.2. The data for individual zircon analysis can be found in Appendix A1.

Two samples yield ages of 52.14 ± 0.88 and 61.88 ± 0.50 Ma, which are considerably older than the magmatic activity that is related to the mineralisation (45 to 39 Ma). Thus, these samples are considered as part of an older magmatic event, that is unrelated to ore.

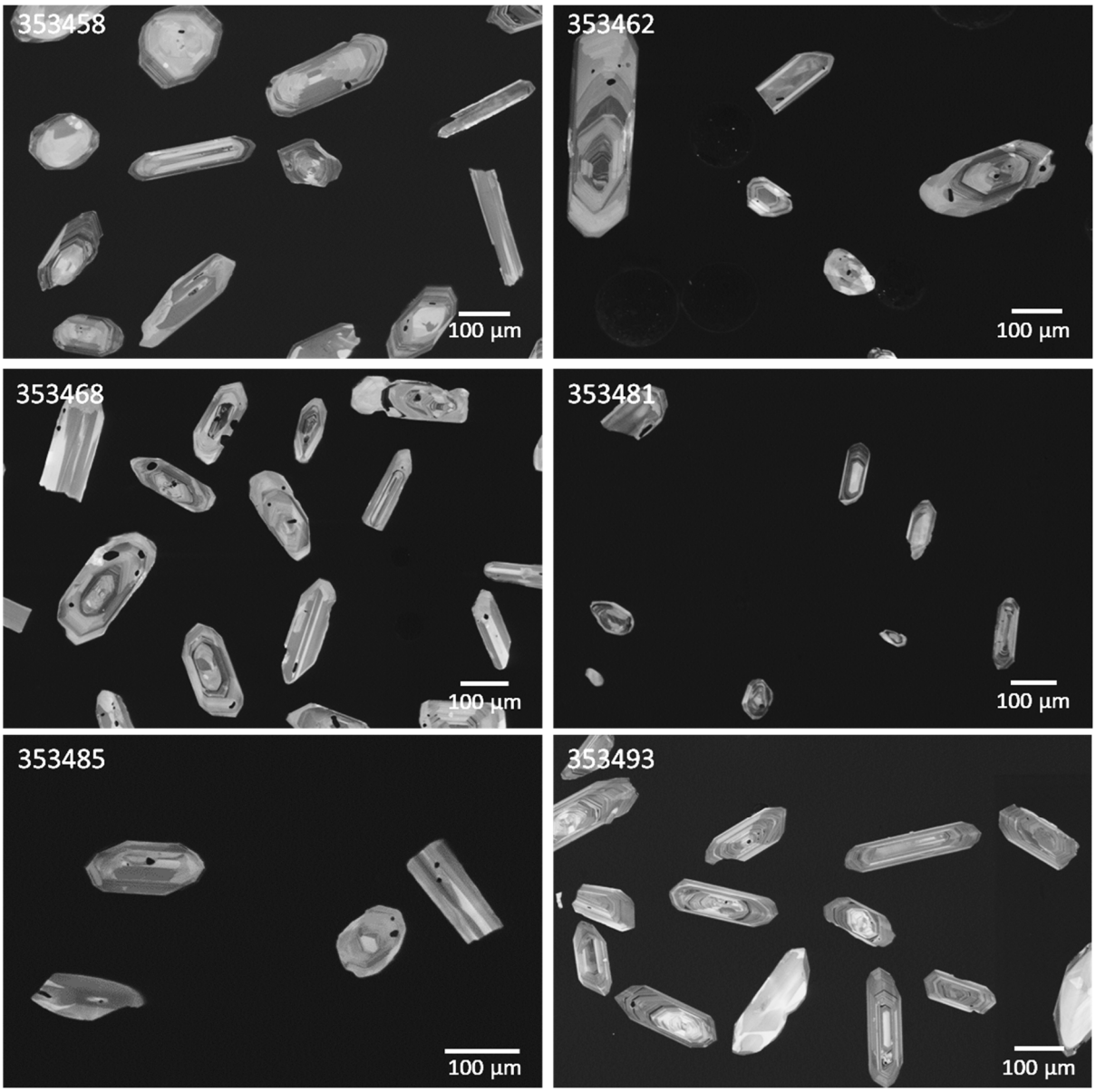

Figure 2.1: Cathodoluminescence images for zircons of selected samples.

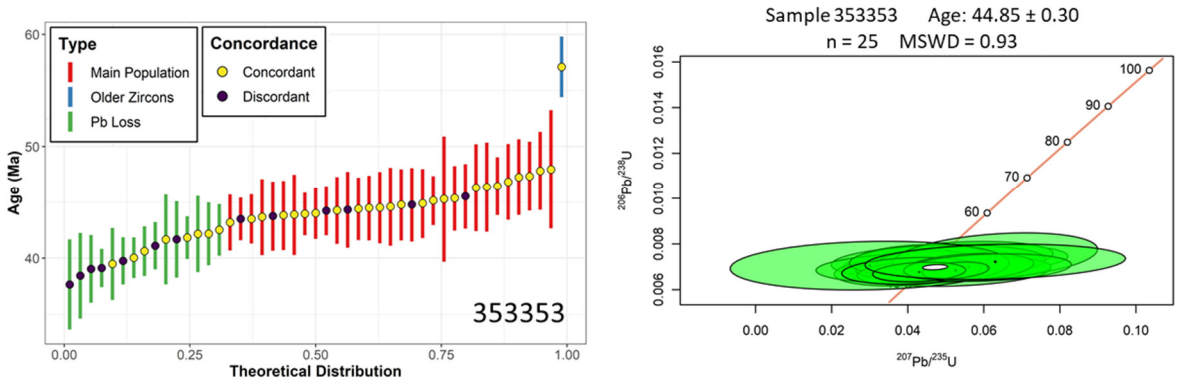

Figure 2.2: PP-plot or cumulative probability plot (left side) and Wetherill concordia diagram (right side). Sample, age, uncertainty and MSWD are shown on the concordia diagram.

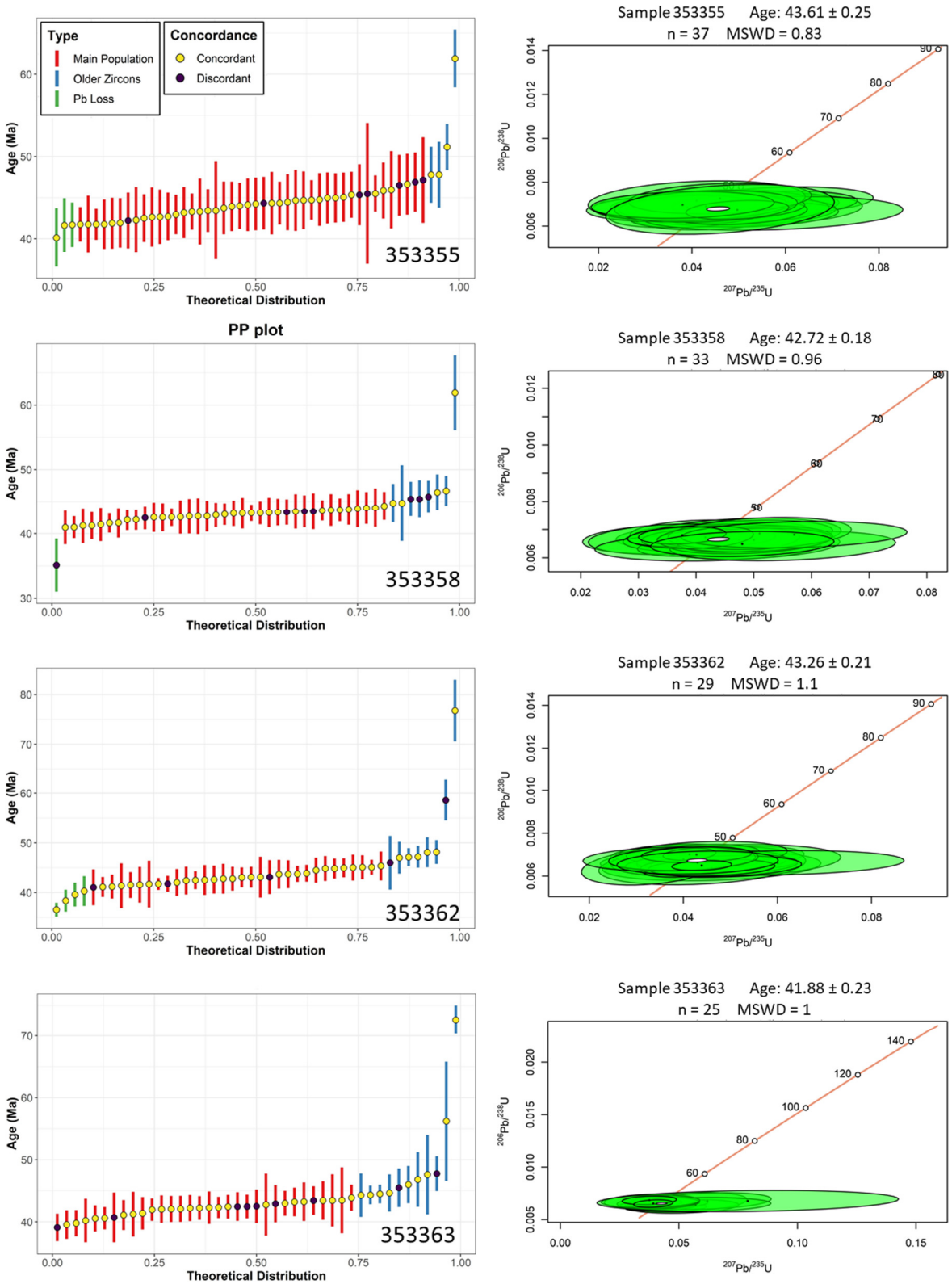

Figure 2.2 continued: PP-plot or cumulative probability plot (left side) and Wetherill concordia diagram (right side). Sample, age, uncertainty and MSWD are shown on the concordia diagram.

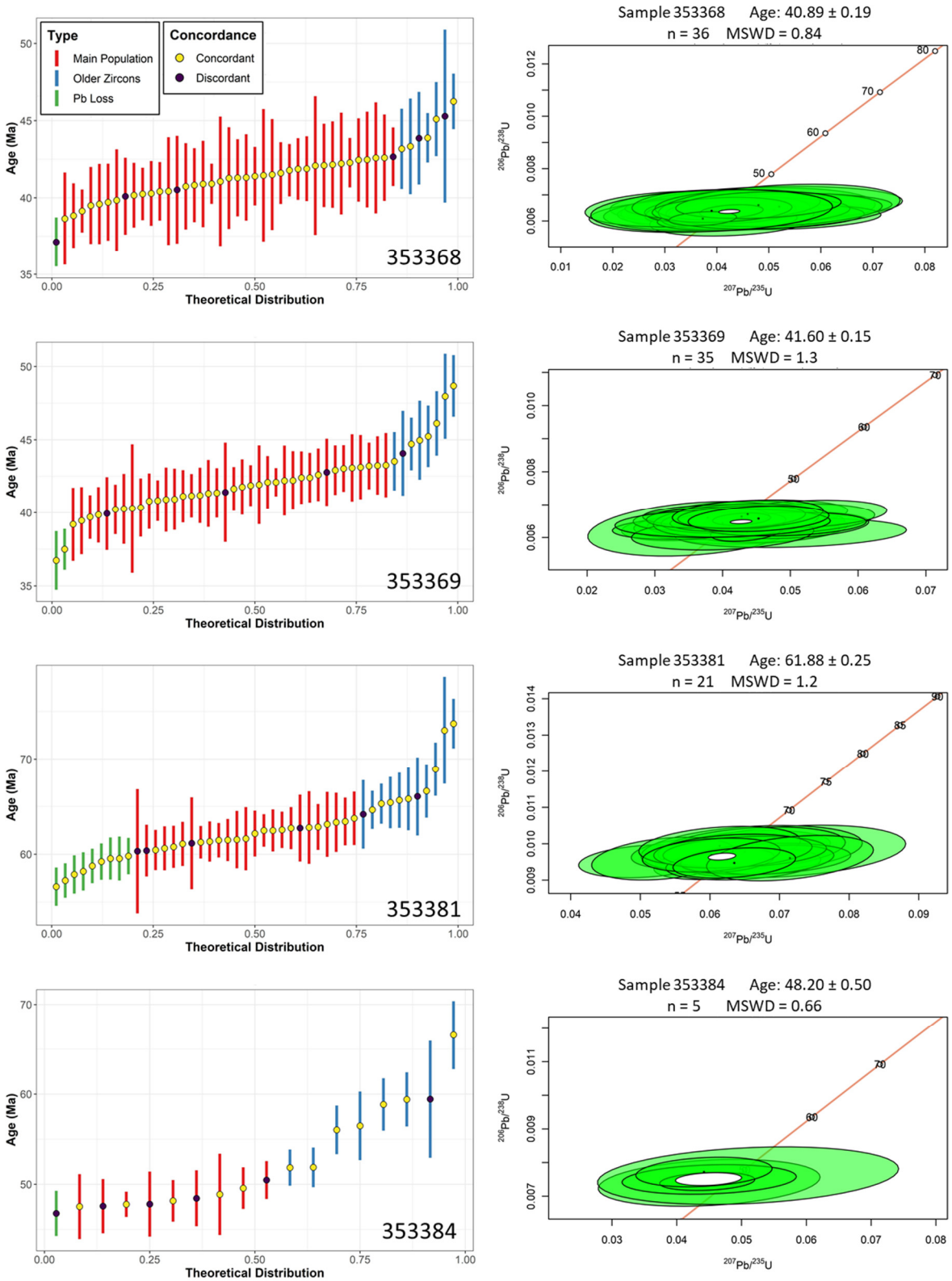

Figure 2.2 continued: PP-plot or cumulative probability plot (left side) and Wetherill concordia diagram (right side). Sample, age, uncertainty and MSWD are shown on the concordia diagram.

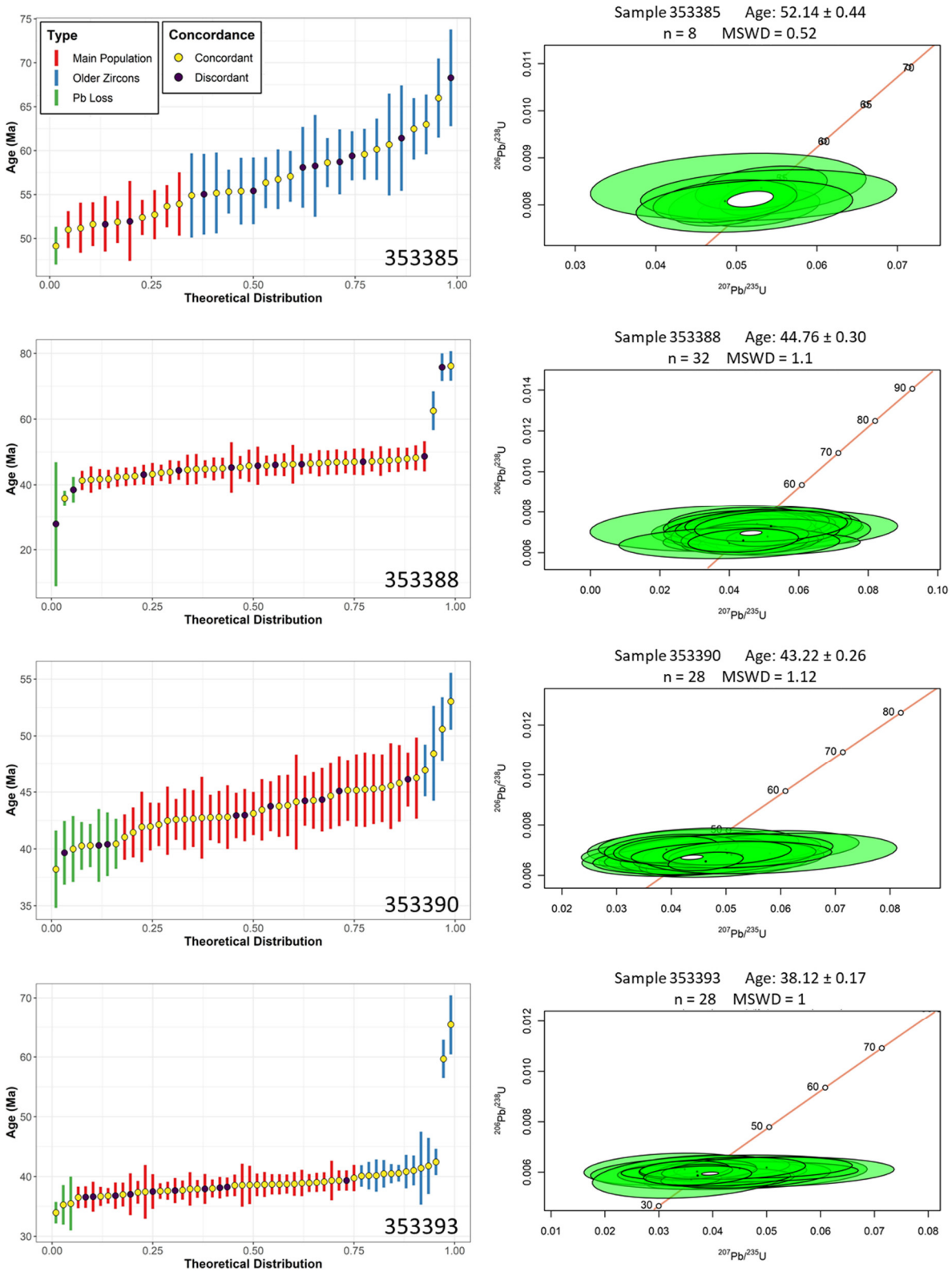

Figure 2.2 continued: PP-plot or cumulative probability plot (left side) and Wetherill concordia diagram (right side). Sample, age, uncertainty and MSWD are shown on the concordia diagram.

Table 2.1: U-Pb zircon ages for the samples of this study.

Sample	Area	Lithology	MgO (wt.%)	Age (Ma) $^{206}Pb/^{238}U$	2SE	MSDW	Concordia Age (Ma)	2SE	MSDW
353358	PB	Granodioritic Porphyry	2.63	42.74	±0.36	0.77	42.72	±0.36	0.96
353390	PB	Dacitic Porphyry	2.03	43.22	±0.52	1.12	43.16	±0.48	0.93
353355	PB	Granodioritic Porphyry	1.06	43.64	±0.50	0.83	43.61	±0.48	0.76
353388	PB	Quartz Monzonite	1.28	44.93	±0.78	1.63	44.76	±0.60	1.1
353353	PB	Dacitic Porphyry	1.72	44.89	±0.60	0.80	44.85	±0.60	0.93
353384	PB	Diorite	3.03	48.23	±1.00	0.50	48.20	±1.00	0.66
353368	PS	Diorite	1.88	40.92	±0.42	0.91	40.89	±0.38	0.84
353369	PS	Quartz Diorite	2.51	41.60	±0.38	1.45	41.60	±0.30	1.30
353363	PS	Granodioritic Porphyry	1.78	41.91	±0.46	0.97	41.88	±0.46	1.00
353362	PS	Granodioritic Porphyry	1.37	43.29	±0.54	1.49	43.26	±0.42	1.10
353393	TYC	Rhyodacitic Porphyry	0.64	38.15	±0.36	0.96	38.12	±0.34	1
353385	UR	Dioritic Porphyry	5.64	52.16	±0.88	0.65	52.14	±0.88	0.52
353381	UR	Dacitic Porphyry	3.11	61.93	±0.50	0.67	61.88	±0.50	1.20

PB = Polo Sur, PB= Penacho Blanco, TYC = Telégrafo y Caracoles, UR= Unrelated.

Samples from Penacho Blanco gave concordia ages between 44.85 ± 0.60 to 42.72 ± 0.36 Ma, which fits the age range of 45 to 44 Ma previously reported of the deposit (Mpodozis and Cornejo, 2012). The sample 353384, related to Penacho Blanco area, yielded an age of 48.20 ± 1 Ma, which it is older than expected for that deposit; however, the geochemistry and isotopic data of the six concordant zircons from that sample suggest that they might share a similar evolution and be considered as part of Penacho Blanco deposit.

Polo Sur samples were dated from 43.26 ± 0.42 to 40.89 ± 0.38 Ma, similar range than that described before for Polo Sur deposit of 42 – 41 Ma, whereas the TYC area porphyry gave an age of 38.12 ± 0.34 Ma, which falls in the range of 39-38 Ma for the mineralized porphyries of that Area (Mpodozis and Cornejo, 2012).

The mean square weighted deviation (MSWD) for all samples ranges from 0.52 to 1.3 for zircons with concordant ages. The lowest values of 0.52 and 0.66 are associated with the samples with 5 and 8 grains considered to calculate the age.

The density distribution of the grains, considered to be inherited zircons (~15% of the whole dataset), shows seven different peak ages. The main group, which spans from approximately 41 to 48 Ma, covers a similar range to the deposits and are considered to be antecrysts (zircon crystals that crystallized from an earlier pulse of magma and which are incorporated in a later pulse, following Miller et al., 2007). The other groups comprise zircons with ages at nearly 57, 65 and 74 Ma. These, together with two zircons with ages of nearly 150 and 200 Ma from the TYC Porphyry (Sample 353393), and one zircon (core and rim) from the Penacho Blanco area, with an age of nearly 420 Ma (Sample 353355), are interpreted to be xenocrysts.

2.3 Petrography of the samples

2.3.1 Veinlets

The veinlets observed in the samples are typical of porphyry copper deposits. They were classified following Gustafson and Hunt (1975) and Sillitoe (2010), according to their temporal evolution into "A", "B", "C" and "D" type veinlets. Early "A" type veinlets are usually thin (millimetric scale) and sinuous filled with quartz + potassic feldspar + Cu-Fe bearing sulphides (pyrite, chalcopyrite, bornite, digenite), usually without selvages (eg. Figure 2.3B and Figure 2.4A), "B" veinlets have a straight shape, commonly without alteration selvages and are filled by quartz + molybdenite + Cu-Fe sulphides ± anhydrite (eg. Figure 2.4A). "C" type veins are thin chalcopyrite-pyrite veins encased by millimetre to centimetre wide chlorite-sericite alteration haloes (e.g. Figure 2.3I). "D" veinlets are commonly related to late, lower temperature events and are characterised by the quartz + pyrite filling with feldspar destructive quartz-sericite haloes (not observed in the selected samples).

2.3.1 Penacho Blanco

Eleven samples from Penacho Blanco, which range in composition from dioritic to dacitic, were studied. The Penacho Blanco porphyries cover a slightly broader compositional range than Polo Sur and vary from intermediate to felsic. The most mafic units are hornblende diorites (Figure 2.3E), hornblende quartz diorites and hornblende-biotite quartz monzonites (n=3). The samples considered porphyries vary from hornblende-biotite 'daciandesitic' porphyries (an informal term to refer a composition equivalent to a quartz diorite-tonalite, n=2, Figure 2.3F) to hornblende-biotite and biotite dacitic porphyries (n=6, Figure 2.3I). Overall, the alteration is weak to moderate and includes propylitic, phyllic and chlorite sericite alteration (Figure 2.3E, G, H and I) with some potassic alteration associated with 'A' type veins. The mineralisation is disseminated chalcopyrite and pyrite, together with pyrite, chalcopyrite and traces of bornite associated with veins (Figure 2.3G).

2.3.2 Polo Sur

Ten samples from Polo Sur were studied. They span from diorite to dacite in composition. The most mafic units vary from diorite to quartz diorite with hornblende and biotite (n=4, Figure 2.3A). These are the only samples that do not have a porphyritic texture. The other units

correspond to granodioritic porphyries (n=3) and dacitic porphyries (n=3) with phenocryst of plagioclase, hornblende, biotite and 'quartz eyes' (Figure 2.3 B, C and D). The alteration is weak to moderate, being dominated by phyllic, sericite-chlorite and propylitic alteration that affects mainly mafic minerals and plagioclase, with 'A', 'B', and 'C' types veinlets (Figure 2.3 A and B). The primary sulphide minerals are chalcopyrite and pyrite, with some traces of bornite that are associated with 'C' type veins or veins halos.

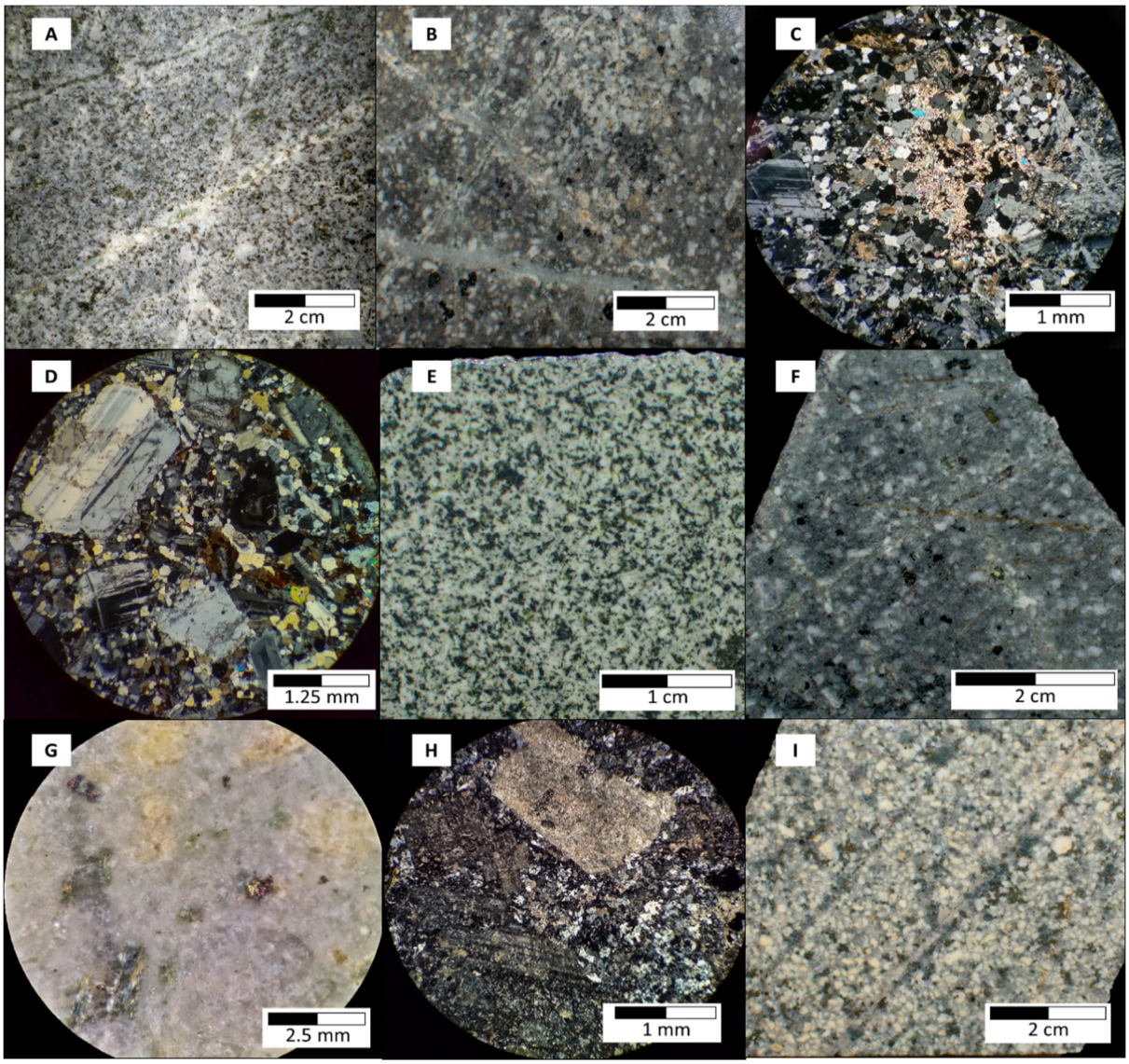

Figure 2.3: A) Sample 353368: biotite-quartz diorite from Polo Sur Deposit. The sample is cut by 'C' type chlorite-sericite veins with chalcopyrite>pyrite mineralisation. B) Sample 353371: Hornblende-biotite dacitic porphyry from Polo Sur Deposit. The 'A' type veinlets are cut by 'B' type veinlets. C) Photomicrograph of sample 353370: Hornblende-biotite dacitic porphyry with and sericite cumulus in the groundmass. D) Photomicrograph of sample 353363: hornblende-biotite granodioritic porphyry from Polo Sur Deposit. E) Sample 353387: hornblende diorite from Penacho Blanco Deposit. Hornblende crystals are altered to chlorite and plagioclase is partially replaced by epidote. F) Sample 353356: biotite 'daciandesitic' porphyry' from Penacho Blanco cut by a thin quartz-sulphide veins. There are no quartz phenocrysts. G) Sample 353354: details of chlorite-sericite alteration superimposed by phyllic alteration from Penacho Blanco deposit. Bornite-Chalcopyrite association is disseminated. H) Photomicrograph of sample 353354 showing moderate phyllic alteration. The plagioclase and groundmass are partially replaced by sericite. I) Sample 353359: hornblende-biotite dacitic porphyry from Penacho Blanco. Porphyry is weak to moderately altered to sericite-chlorite-clays. It is cut by 'C' type veinlets of sericite-chlorite with chalcopyrite.

2.3.3 Telégrafo and Caracoles (TYC)

The three samples from TYC area are biotite rhyodacitic porphyries with abundant quartz 'eyes', plagioclase and biotite as phenocrysts in a groundmass composed of quartz, plagioclase, potassic feldspar and biotite. All the samples have weak to moderate potassic alteration, associated with thin 'A' type veins that are cut by 'B' type veins of quartz-anhydrite. The main sulphide mineralisation is chalcopyrite, pyrite and molybdenite associated with 'B' type veins (Figure 2.4A, B and C).

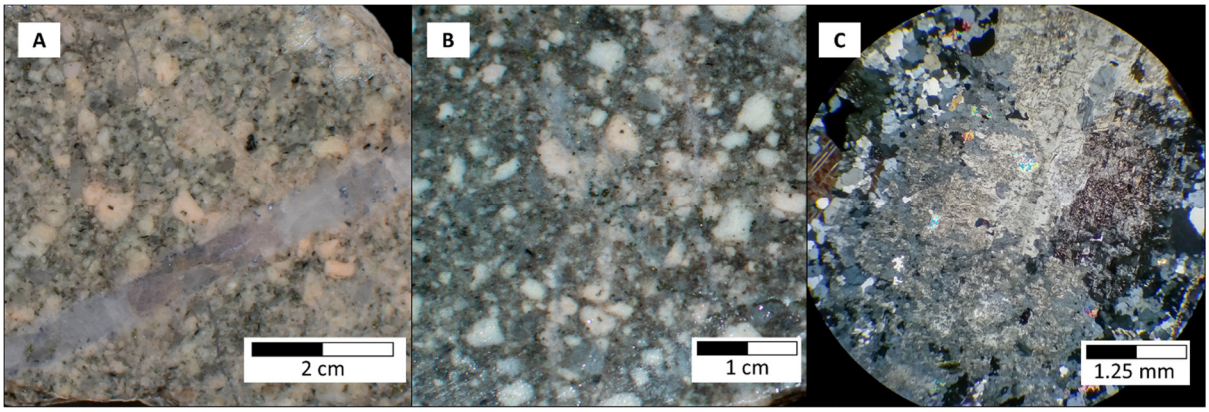

Figure 2.4: Porphyries from the TYC area. A) Sample 353393: Rhyodacitic porphyry with potassic alteration where plagioclase is replaced by pink potassic feldspar. A thin 'A' type vein is cut by a quartz-anhydrite-molybdenite 'B' type vein. B) Sample 353394: Rhyodacitic porphyry with weak potassic alteration and abundant quartz eyes. C) Photomicrograph of sample 353392: plagioclase replaced by potassic feldspar and anhydrite.

2.3.4 Samples not related to the mineralised porphyries

The fourth group of six samples, which despite including porphyritic samples related to the deposits, have ages that are significantly older than the deposit or their geochemical signature is distinctly different from the overall trend shown by samples from the deposits. These samples are designated by a grey colour on the figures and are classified as 'Unrelated' to ore.

2.4 Geochemistry

The results of major and trace element analyses can be found in Appendix A2. Three correlograms are included in this appendix to illustrate the correlations among major and trace element data.

2.4.1 Major Elements

The samples from the mineralised porphyries and those from the unrelated group follow a calk-alkaline trend on an AFM diagram (Figure 2.5A). Most of the samples fall in the medium potassium series on a K_2O v SiO_2 plot but tend to migrate into high potassium series at higher silica content (Figure 2.5B).

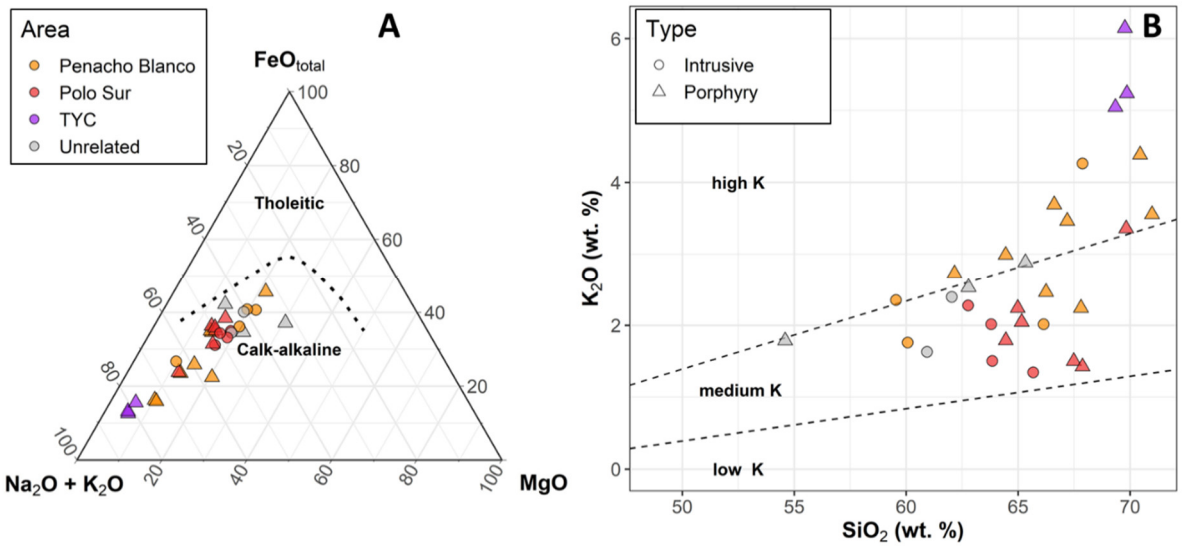

Figure 2.5: A) AFM classification diagram for the samples of the area of study after Le Maitre et al. (2005). B) Silica versus potassium diagram after Le Maitre et al. (2005). Triangles indicate those porphyries related with mineralization while circles intrusive units that are related with the source magma of these porphyries This symbology repeats in future figures.

The geochemical classification ranges from dioritic to granitic according to the total alkalis vs silica diagram for plutonic rocks (Figure 2.6; Wilson, 1989 after Cox et al., 1979). However, the data are scattered among the chart for samples with more than 65 wt.% of SiO_2 and shift towards higher alkali contents for the higher silica samples.

The variation of selected elements, presented as oxides, in relation with MgO wt. % are shown in Figure 2.7 and Figure 2.8. The plotted values are corrected to their loss on ignition (LOI), which varies from 0.6 wt. % to 5 wt. %. The MgO contents range from 1 wt. % to slightly over 3.7 wt. % for the Penacho Blanco Deposit, from 1.4 to 2.5 wt. % in Polo Sur, from 0.6 to 0.7 wt.% in the TYC area and from 2 to 5.6 wt. % in the samples that are not related to the mineralisation.

The overall trend for Al_2O_3 is to decrease with decreasing MgO in each system, with a gentle drop at nearly 2.0 wt. % MgO. The aluminium values vary from 14.75 to 17.81 wt. % for Penacho Banco, between to 15.40 and 17.97 wt.% for Polo Sur, from 15.18 to 15.88 wt. % for TYC and between 15.88 to 17.92 wt. % for the unrelated group (Figure 2.7 A).

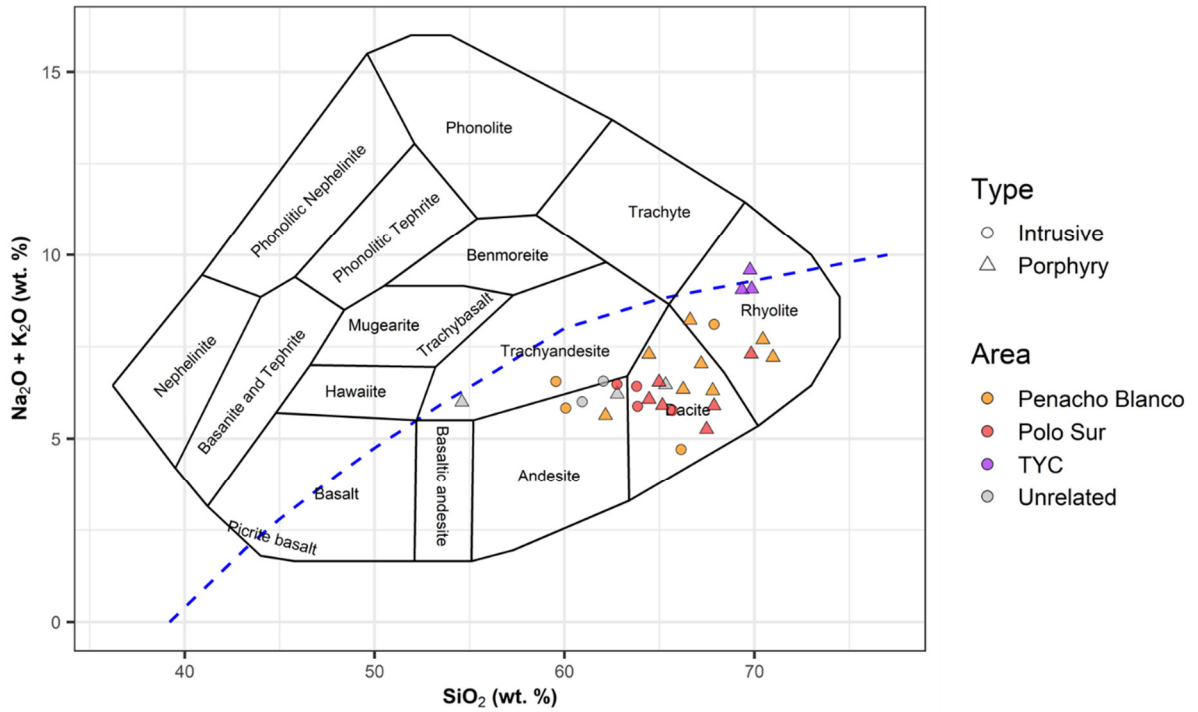

Figure 2.6: Total Alkalis vs Silica classification diagram for intrusive rocks after Wilson (1989). The blue line separates alkaline from subalkaline rocks.

Potassium increases for samples with the lowest MgO content, with values slightly lower for Polo Sur than for Penacho Blanco (Figure 2.7 B) with a drastic increase around 1.0 wt.% MgO for samples from TYC and Penacho Blanco samples. The concentration varies from 4.3 to 1.7 wt.% at Penacho Blanco and 3.3 to 1.3 wt% in Polo Sur and 6.1 to 5 wt.% at TYC. Samples not related to mineralisation show a narrower spread of values that vary from 2.8 to 1.6 wt.%.

The calcium and sodium concentrations are, to some extent, scattered but show a general decrease with decreasing MgO (Figure 2.7 C and D). Calcium values range from 6.0 to1.7 wt. % in Penacho Blanco, between 2 and 5 wt.% in Polo Sur, from 2.5 to 1.9 wt.% at TYC and from 7.0 to 2.5 wt.% in the unrelated samples. Sodium abundances vary from 4.5 to 2.7 wt.% at Penacho Blanco, 4.4 to 3.7 wt.% in Polo Sur and 4.0 to 3.4 wt.% in TYC. The non-related samples vary from 4.3 to 3.5 wt.% (Figure 2.7 D).

Phosphorus shows a constant decrease from 0.4 wt.% in the most mafic member to 0.1 wt.% in the most felsic samples, which is attributed to apatite fractionation (Figure 2.7 E).

The total iron content, as ferric iron (Fe_2O_3), steadily decreases with decreasing MgO from 8.7 to 1.73 wt. % in Penacho Blanco, 5.5 to 3.0 wt.% in Polo Sur, 2.0 to 1.5 wt. % in TYC, and from 7.6 to wt. % to 5.4 for the samples not related to mineralisation (Figure 2.8A). The least differentiated sample falls out of the general trend and contains over 7.5 wt.% iron. A similar trend

is observed for titanium, which decreases from 1 wt. % to 0.3 wt. % with decreasing MgO (Figure 2.8B).

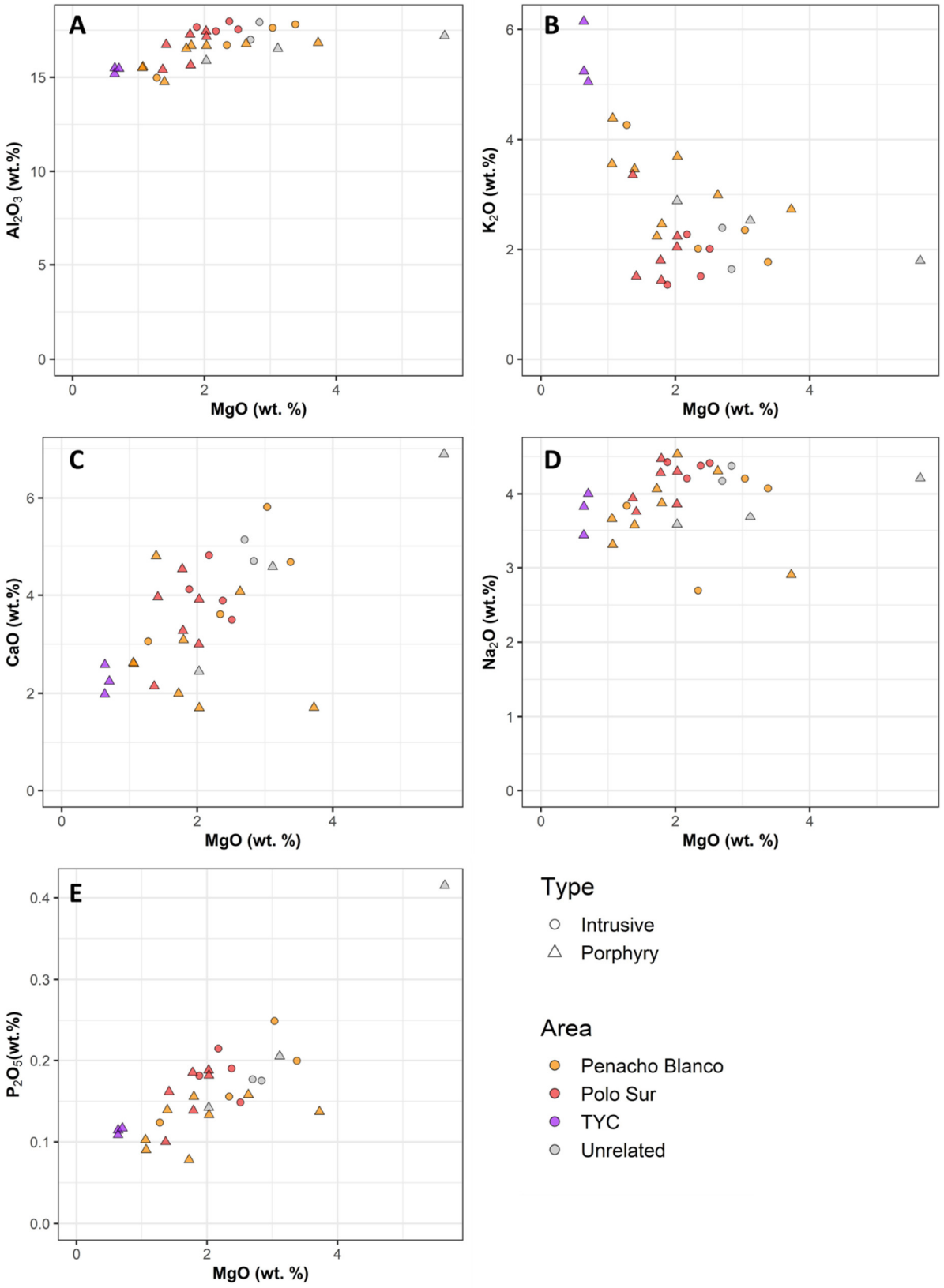

Figure 2.7: A) Al_2O_3 vs MgO binary variation diagram. B) K_2O vs MgO binary variation diagram. C) CaO vs MgO binary variation diagram. D) Na_2O vs MgO binary variation diagram. E) P_2O_5 vs MgO binary variation diagram.

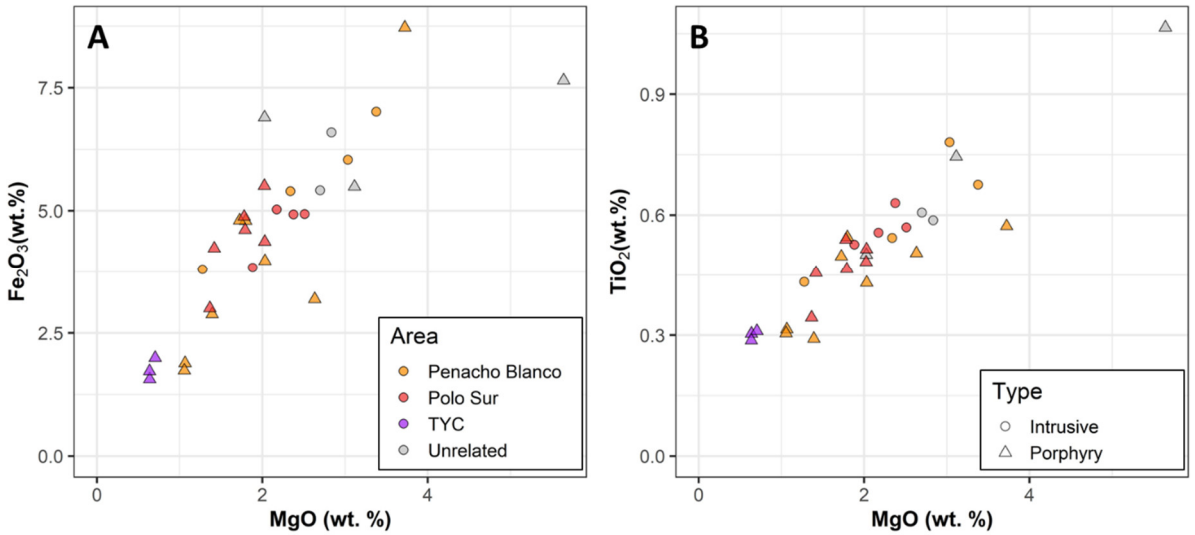

Figure 2.8: A) Fe_2O_3 vs MgO binary variation diagram. B) TiO_2 vs MgO binary variation diagram.

2.4.2 Trace elements

Ore related metals (Cu, Mo, Au, Ag) have an overall scattered pattern when compared with the MgO contents of the samples. Copper shows a significant variation of nearly three orders of magnitude from as low as 4 ppm to as high as 0.75 wt.%. Similarly, gold varies by nearly three orders from 0.02 to 63 ppb. Molybdenum and silver show a narrower variation than copper and gold. Also, Cu and Au, and Cu and Ag high correlation suggest that they might be introduced by the same fluids.

The V and Sc show an almost identical pattern that declines with the decrease of MgO, but at a higher rate for Polo Sur than for Penacho Blanco. Samples from the TYC area and the unrelated samples are scattered without a clear pattern (Figure 2.10 A and B).

The Strontium has a scattered pattern when plotted against MgO (Figure 2.10 C) with concentrations varying between approximately 200 ppm and more than 900 ppm. Polo Sur deposit shows the highest variability ranging from 200 to 930 ppm, whereas Penacho Blanco spans from 200 to 700 ppm. The TYC samples yield values slightly lower than 400 ppm and the intrusions unrelated to ore have scattered Sr.

The yttrium concentrations define a trend that falls slightly at lower MgO values for Penacho Blanco and Polo Sur, with lower overall values for TYC (Figure 2.10 D). Some of the samples from the unrelated group are enriched in yttrium with contents that are up to one order of magnitude higher than for those samples related to the porphyries.

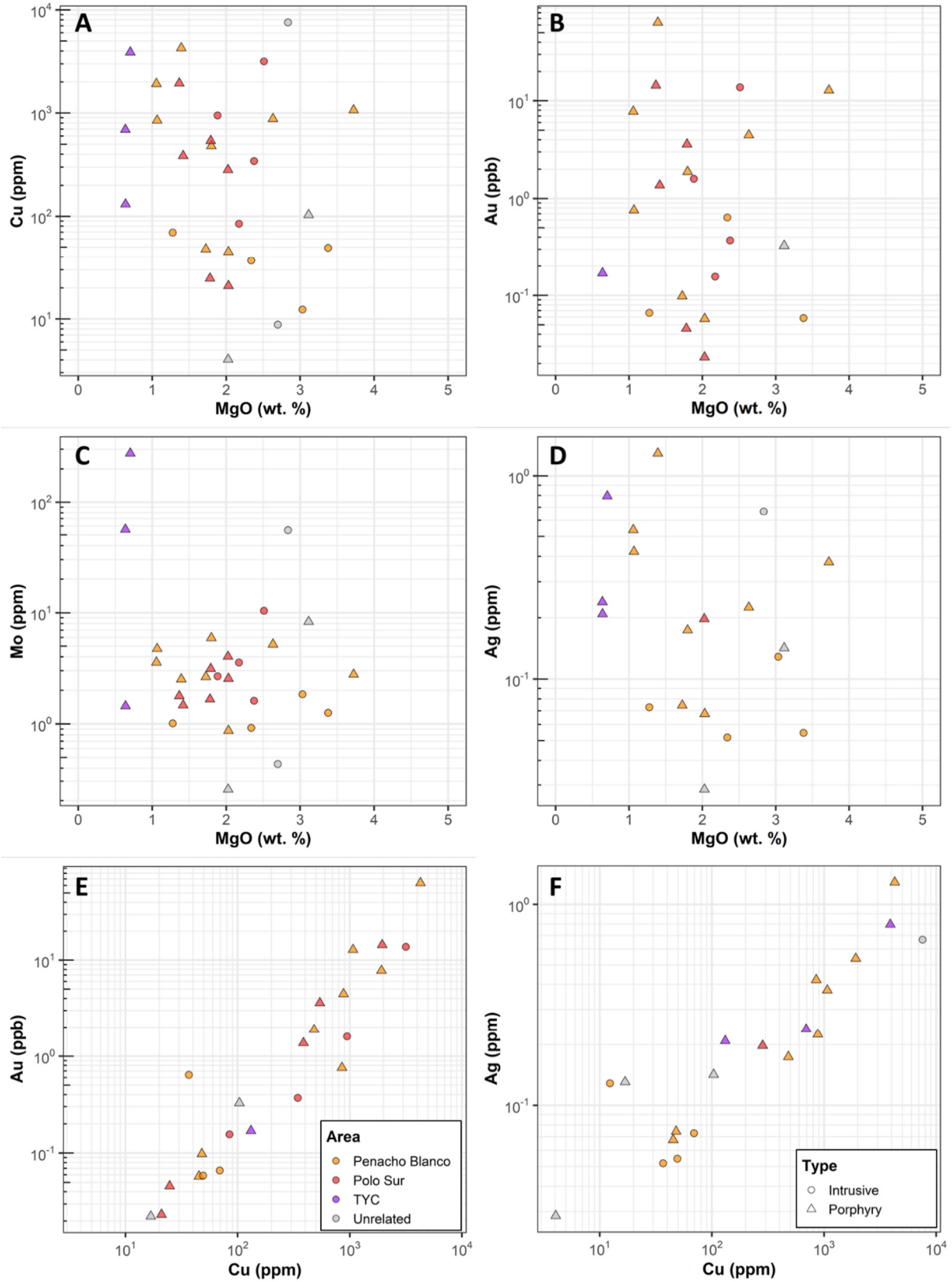

Figure 2.9: A) Cu vs MgO binary variation diagram. B) Au vs MgO binary variation diagram. C) Mo vs MgO binary variation diagram. D) Au vs Cu binary variation diagram.

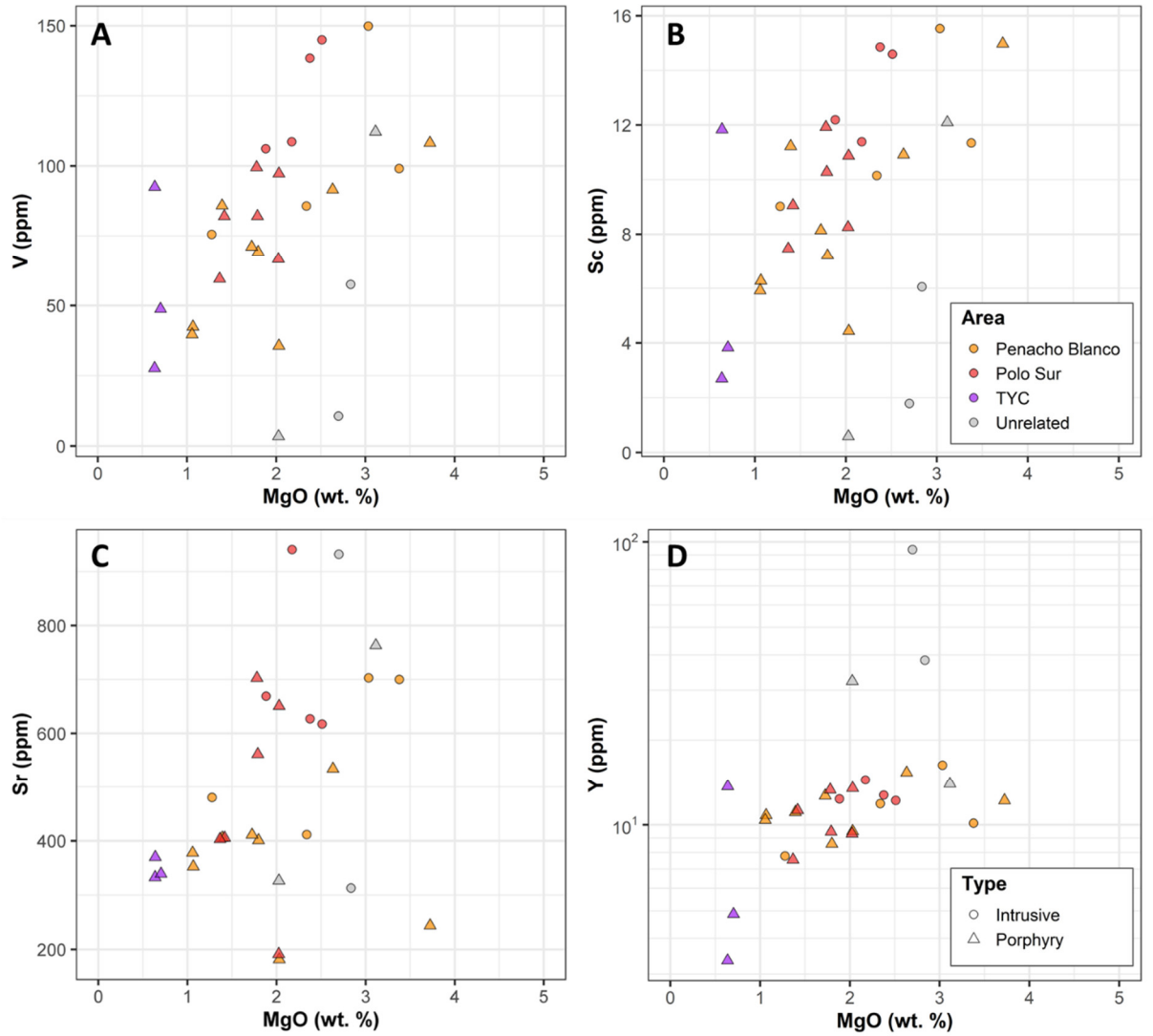

Figure 2.10: A)V vs MgO binary variation diagram. B) Sc vs MgO binary variation diagram. C) Sr vs MgO binary variation diagram. D) Y vs MgO binary variation diagram.

Primitive mantle normalised multi-element diagrams for the deposits and the unrelated samples are shown in Figure 2.11. The patterns for Polo Sur, Penacho Blanco and TYC are subparallel and show typical arc magma enrichment in LILE and Pb, and depletion in the HFSE, Nb and Ta (Kelemen et al., 2014). The group of unrelated samples shows erratic patterns, with some arc characteristics but two are strongly depleted in thorium and some have higher heavy rare earth elements concentrations that the ore-related samples.

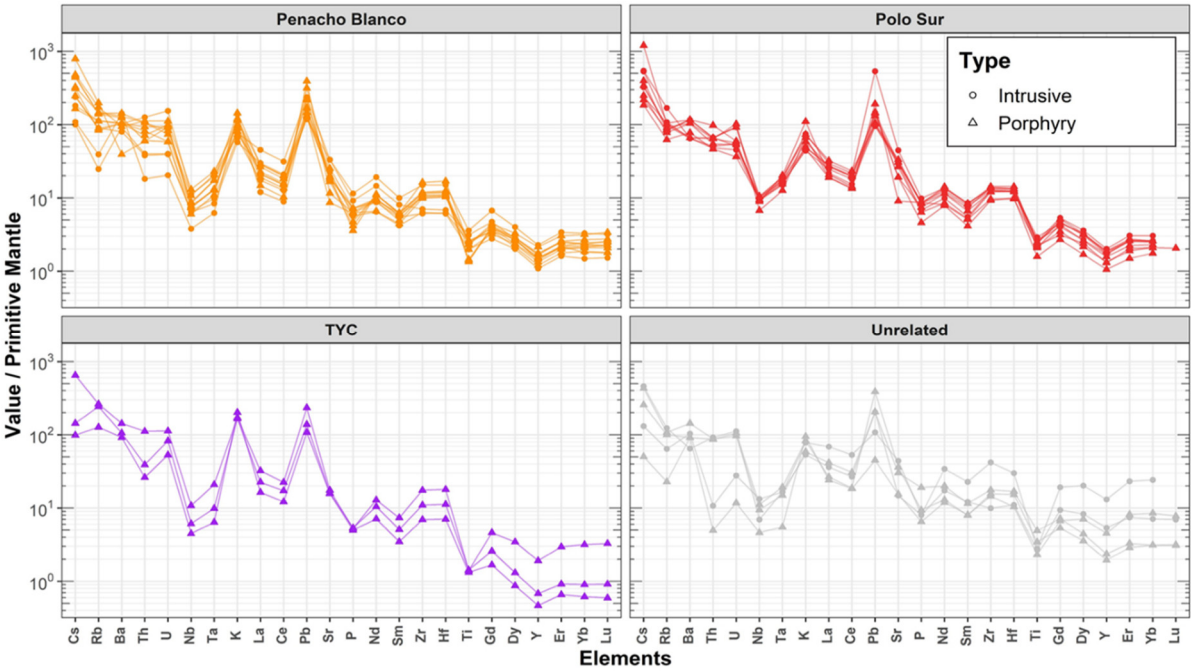

Figure 2.11: Multielemental spider incompatible diagram. The average values are normalized to the primitive mantle values of Palme and O'Neill, 2014.

Chondrite normalised rare earth element patterns are plotted in Figure 2.12. The patterns for the deposits are spoon-shaped, with enrichment of the LREE relative to the HREE and depleted in MREE for samples associated with deposits. The europium anomaly varies from slightly positive to slightly negative. In contrast, the unrelated group have a different pattern, which shows a negative europium anomaly in some samples and higher HREE values.

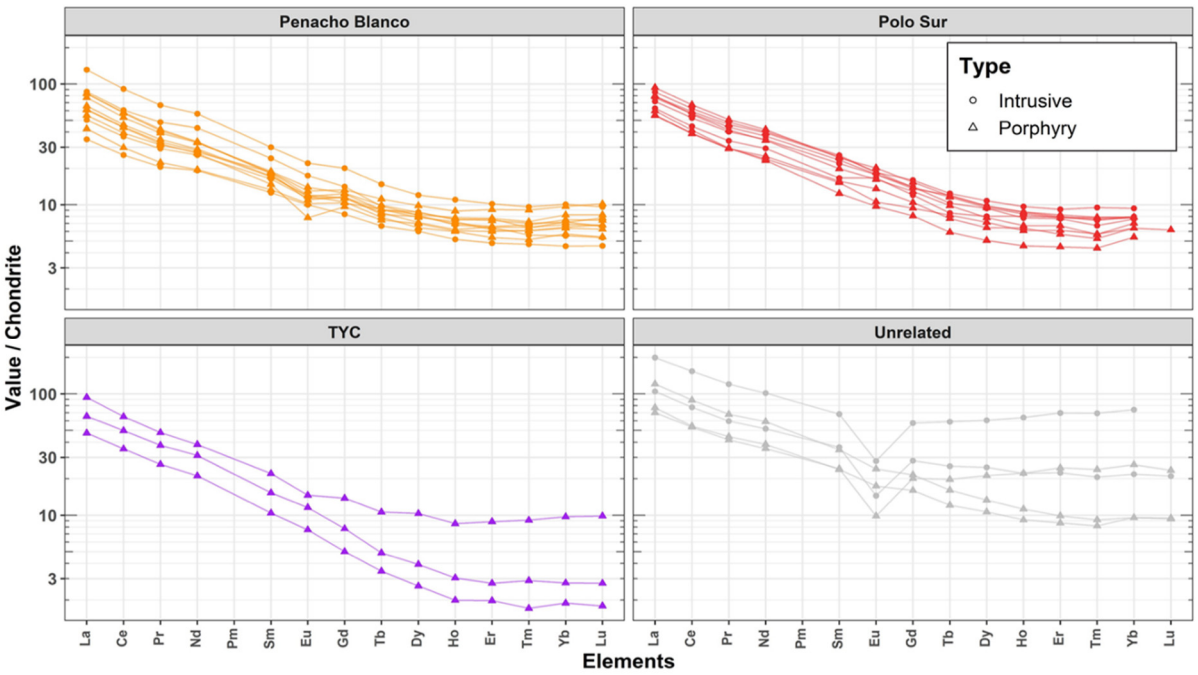

Figure 2.12: Rare earth element patterns normalised to chondrite values of McDonough and Sun, 1995.

2.4.3 Platinum group elements, Re and Au geochemistry

The results for PGEs, Re and Au of the samples are listed in Table 2.2 and plotted against MgO in Figure 2.13 and Figure 2.14.

Platinum and Pd contents of samples from the Penacho Blanco deposit decreases with decreasing MgO from 1.852 to 0.068 ppb and 1.577 to 0.018 ppb, respectively, whereas at Polo Sur they show scattered patterns without a clear trend with values that varies between 0.652 and 0.017 ppb for Pt and from 3.297 to 0.015 ppb for Pd. The only TYC sample analysed for PGE had a Pt value of 0.018 ppb and Pd = 0.142 ppb, whereas the unrelated samples vary from 0.201 to 0.368 ppb and 0.145 to 0.286 for Pt and Pd, respectively.

Rhenium concentration is scattered in both deposits and range from 92.708 to 0.214 ppb at Penacho Blanco, 2.523 to 0.101 ppb in Polo Sur, from nearly 1 to 0.040 in the unrelated group and 32.75 ppb in the TYC sample.

Gold values might be underestimated because the results obtained for the TDB-1 standard that gave an average value of 2.02 ± 1.5 ppb, which it is approximately 50 to 75% lower than the values reported in GeoRem (Jochum et al., 2005) of 3.9 – 8.4 ppb. However, this wide range of values indicates that TDB-1 is a heterogeneous standard for this element. Gold values range from 76.29 to 0.054 ppb in Penacho Blanco Deposit, 0.019 to 27.21 ppb in Polo Sur, 0.165 for the TYC sample and from 0.017 to 0.335 ppb in the unrelated group (Figure 2.9 B, Table 2.2).

Most of the Rh, Ir and Ru fell below the detection limits of the method. Only one sample fell above the limit of detection (LOD) for Ir in Penacho Blanco, and four above the LOD in Polo Sur. All the Ru and Rh data for Polo Sur is below LOD, whereas in Penacho Blanco, one sample of Ru and seven of Rh are above LOD.

Duplicate analysis of eighteen samples were performed to evaluate homogeneity and the presence of nuggets (Au, Re or PGE bearing nanoparticles as minerals or alloys) in the samples. Most of the duplicate analyses from Penacho Blanco deposit yield values that lie relatively close to the corresponding to their first analyses values which suggest that the samples are homogeneous in this deposit. However, differences of up to one order of magnitude between duplicates for some samples of Polo Sur suggest the present some Pd-Pt nuggets (open symbols in Figure 2.13 and Figure 2.14).

Table 2.2: Table with determined values for platinum group elements and Re. Errors are 2σ.

Sample	*Area*	*Ir (ppb)*		*Ru (ppb)*		*Rh (ppb)*		*Pt (ppb)*		*Pd (ppb)*		*Re (ppb)*		*Au (ppb)*	
353352	Penacho Blanco	b.d.l.		b.d.l.		0.009	±0.001	1.85	±0.024	1.58	±0.041	13.65	±0.318	12.83	±0.581
353352*	Penacho Blanco	b.d.l.		b.d.l.		0.007	±0.001	1.61	±0.017	1.40	±0.083	13.76	±0.078	6.79	±0.558
353353	Penacho Blanco	b.d.l.		b.d.l.		b.d.l.		0.11	±0.006	0.13	±0.010	28.73	±0.350	0.10	±0.011
353354	Penacho Blanco	b.d.l.		b.d.l.		0.006	±0.001	0.09	±0.004	0.07	±0.002	4.10	±0.039	0.75	±0.041
353354*	Penacho Blanco	b.d.l.		b.d.l.		b.d.l.		0.08	±0.003	0.05	±0.005	5.64	±0.087	3.34	±0.285
353355	Penacho Blanco	b.d.l.		b.d.l.		b.d.l.		0.08	±0.003	0.28	±0.018	5.08	±0.056	7.80	±0.659
353356	Penacho Blanco	0.013	±0.002	b.d.l.		0.005	±0.001	0.21	±0.005	0.26	±0.009	7.40	±0.150	1.89	±0.092
353356*	Penacho Blanco	b.d.l.		b.d.l.		b.d.l.		0.26	±0.005	0.32	±0.021	6.90	±0.094	2.01	±0.168
353358	Penacho Blanco	b.d.l.		b.d.l.		0.004	±0.001	0.48	±0.006	0.46	±0.012	0.35	±0.010	4.47	±0.204
353358*	Penacho Blanco	b.d.l.		b.d.l.		b.d.l.		0.86	±0.011	0.59	±0.037	0.34	±0.010	11.10	±0.912
353359	Penacho Blanco	b.d.l.		b.d.l.		b.d.l.		0.10	±0.003	0.03	±0.003	39.06	±0.786	63.76	±3.139
353359*	Penacho Blanco	b.d.l.		b.d.l.		b.d.l.		0.13	±0.004	0.02	±0.005	44.68	±0.276	76.29	±6.430
353361	Penacho Blanco	b.d.l.		b.d.l.		0.004	±0.001	0.33	±0.007	0.21	±0.006	29.69	±0.682	0.63	±0.031
353361*	Penacho Blanco	b.d.l.		b.d.l.		b.d.l.		0.19	±0.005	0.22	±0.015	92.71	±1.287	0.60	±0.051
353387	Penacho Blanco	b.d.l.		b.d.l.		0.005	±0.001	0.40	±0.008	0.30	±0.006	0.21	±0.003	0.05	±0.004
353387*	Penacho Blanco	b.d.l.		0.010	±0.001	b.d.l.		0.48	±0.009	0.28	±0.018	0.23	±0.003	0.48	±0.040
353388	Penacho Blanco	b.d.l.		b.d.l.		b.d.l.		0.08	±0.004	0.12	±0.007	0.47	±0.013	0.06	±0.005
353388*	Penacho Blanco	b.d.l.		b.d.l.		b.d.l.		0.07	±0.003	0.10	±0.008	0.49	±0.007	0.11	±0.011
353390	Penacho Blanco	b.d.l.		b.d.l.		b.d.l.		0.17	±0.007	0.16	±0.012	0.33	±0.007	0.06	±0.007
353392	TYC	b.d.l.		0.003	±0.001	b.d.l.		0.02	±0.002	0.14	±0.006	32.75	±0.772	0.16	±0.011

* Duplicates Samples

b.d.l below detection limits

Table 2.2: Table with determined values for platinum group elements and Re. Errors are 2σ.

Sample	Area	Ir (ppb)		Ru (ppb)		Rh (ppb)		Pt (ppb)		Pd (ppb)		Re (ppb)		Au (ppb)	
353362	Polo Sur	0.02	±0.002	b.d.l.		b.d.l.		0.17	±0.003	1.04	±0.036	0.93	±0.011	14.42	±0.642
353362*	Polo Sur	b.d.l.		b.d.l.		b.d.l.		0.16	±0.005	1.16	±0.070	1.04	±0.020	27.22	±2.326
353363	Polo Sur	b.d.l.		b.d.l.		b.d.l.		0.07	±0.005	0.35	±0.013	0.10	±0.005	0.05	±0.005
353363*	Polo Sur	b.d.l.		b.d.l.		b.d.l.		0.15	±0.007	0.18	±0.013	0.14	±0.003	0.03	±0.005
353364	Polo Sur	b.d.l.		b.d.l.		b.d.l.		0.02	±0.002	0.02	±0.003	0.63	±0.028	0.02	±0.003
353364*	Polo Sur	b.d.l.		b.d.l.		b.d.l.		0.03	±0.003	0.02	±0.003	0.62	±0.013	0.02	±0.004
353367	Polo Sur	0.07	±0.003	b.d.l.		b.d.l.		0.04	±0.004	0.13	±0.012	0.36	±0.017	0.37	±0.027
353367*	Polo Sur	b.d.l.		b.d.l.		b.d.l.		0.12	±0.003	0.16	±0.011	0.45	±0.009	0.57	±0.048
353368	Polo Sur	b.d.l.		b.d.l.		b.d.l.		0.10	±0.005	0.46	±0.016	1.18	±0.015	1.59	±0.089
353368*	Polo Sur	b.d.l.		b.d.l.		b.d.l.		0.09	±0.003	0.47	±0.030	1.28	±0.033	3.65	±0.306
353369	Polo Sur	b.d.l.		b.d.l.		b.d.l.		0.16	±0.007	0.24	±0.012	2.52	±0.111	13.74	±0.723
353369*	Polo Sur	0.01	±0.003	b.d.l.		b.d.l.		0.13	±0.003	0.28	±0.020	2.40	±0.043	b.d.l.	
353370	Polo Sur	b.d.l.		b.d.l.		b.d.l.		0.25	±0.006	0.93	±0.043	1.13	±0.041	1.37	±0.058
353370*	Polo Sur	b.d.l.		b.d.l.		b.d.l.		0.22	±0.007	1.20	±0.072	1.11	±0.012	2.38	±0.205
353371	Polo Sur	0.04	±0.002	b.d.l.		b.d.l.		0.64	±0.010	2.98	±0.087	1.31	±0.020	3.60	±0.162
353371*	Polo Sur	b.d.l.		b.d.l.		b.d.l.		0.65	±0.018	3.30	±0.198	1.26	±0.027	7.25	±0.617
353372	Polo Sur	b.d.l.		b.d.l.		b.d.l.		0.21	±0.006	0.29	±0.012	0.92	±0.018	0.15	±0.008
353372*	Polo Sur	b.d.l.		b.d.l.		b.d.l.		0.03	±0.003	0.03	±0.004	0.34	±0.007	0.02	±0.004
353381	Unrelated	b.d.l.		b.d.l.		b.d.l.		0.20	±0.005	0.15	±0.012	0.04	±0.001	0.33	±0.029
353385	Unrelated	b.d.l.		0.009	±0.001	0.010	±0.001	0.31	±0.006	0.25	±0.004	1.08	±0.010	0.02	±0.003
353385*	Unrelated	b.d.l.		0.006	±0.001	0.014	±0.001	0.37	±0.007	0.29	±0.019	1.19	±0.012	0.13	±0.012

* Duplicates Samples

b.d.l below detection limits

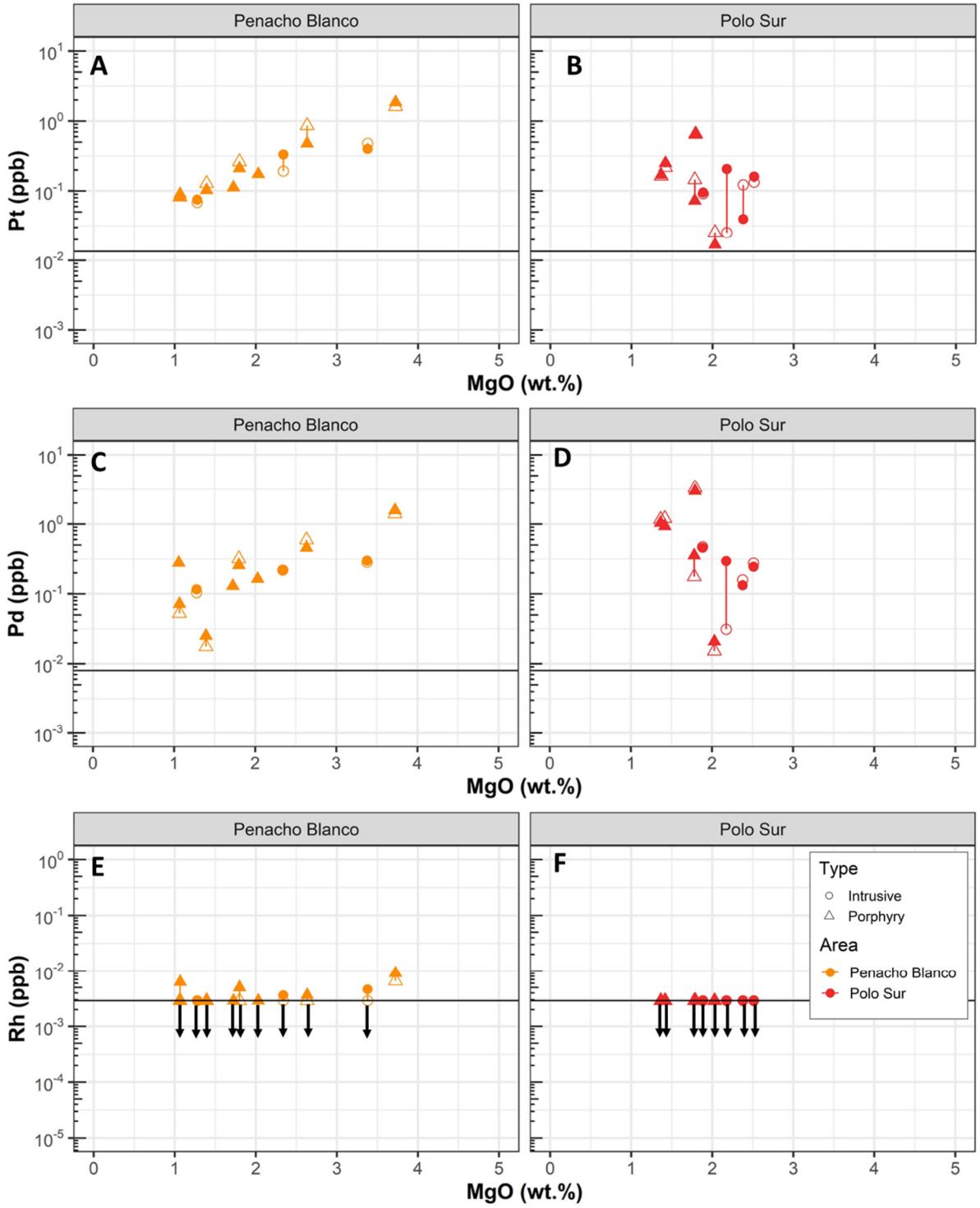

Figure 2.13: Binary diagrams for Pd, Pt and Rh. The horizontal black line indicates the detection limit of the method and black arrows values that are under limits of detection. Open symbols indicate duplicates analysis that are linked with a line to its first analysis. A) Pt vs MgO binary diagram for Penacho Blanco. B) Pt vs MgO binary diagram for Polo Sur. C) Pd vs MgO binary diagram for Penacho Blanco. D) Pd vs MgO binary diagram for Polo Sur. E) Rh vs MgO binary diagram for Penacho Blanco. F) Rh vs MgO binary diagram for Polo Sur.

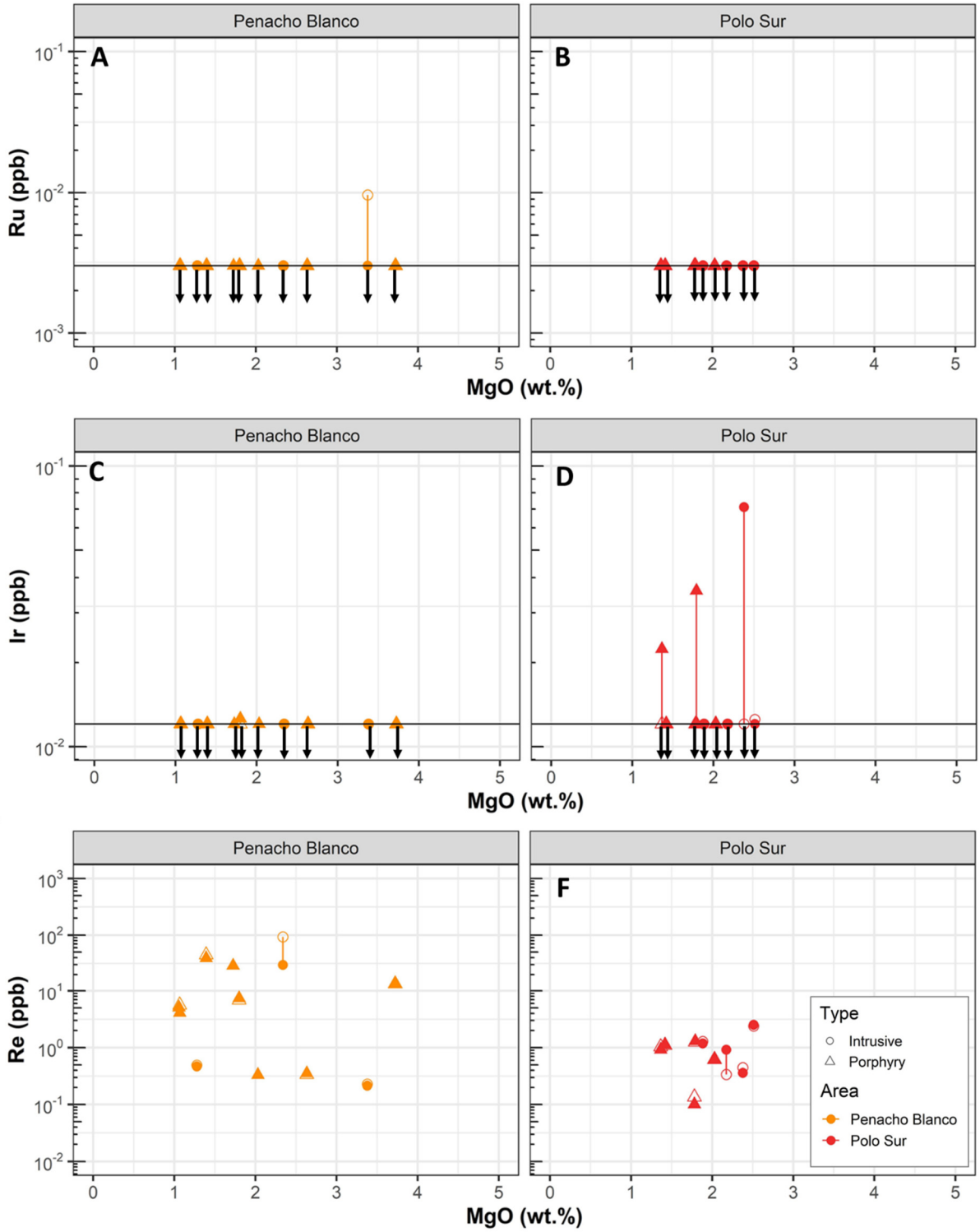

Figure 2.14: Binary Diagrams for Ru, Re and Ir. The horizontal black line indicates the detection limit of the method and black arrows values that are under limits of detection. Open symbols indicate duplicates analysis that are linked with a line to its first analysis. A) Ru vs MgO binary Diagram for Penacho Blanco. B) Ru vs MgO binary Diagram for Polo Sur. C) Ir vs MgO binary Diagram for Penacho Blanco. D) Ir vs MgO binary Diagram for Polo Sur. E) Re vs MgO for Penacho Blanco F) Re vs MgO binary Diagram for Polo Sur.

2.5 Zircon Geochemistry and oxygen isotopes

Zircon trace element geochemistry was used to calculate the Ce^{4+}/Ce^{3+} ratio of the zircons following the method of Ballard et al. (2002) and the temperature of zircon crystallization was calculated using Ti in zircon thermometry (Watson et al., 2006; Ferry and Watson, 2007). Oxygen isotopes were analysed to obtain an insight into the origin of the melts.

The results are listed in Appendix A1, and the following sections will present summary statistics for the studied samples. Robust statistics, median and the median absolute deviation (MAD) are preferred over the mean and standard deviation because these parameters that are less affected by outlier values (e.g. out of context or inherited zircons).

2.5.1 Ti-in-zircon thermometry

The parameters assumed for this calculation were a SiO_2 activity = 1, based on the presence of quartz in all the samples and a TiO_2 activity ($aTiO_2$) of 0.7, following Dilles et al. (2015). Although the $aTiO_2$ may not always be 0.7, most of the silicic magmas usually have $aTiO_2$ >0.6 (Hayden and Watson, 2007), which mean that out of the context zircons rarely underestimate the temperatures by more than ~ 50 °C degrees (Hayden and Watson, 2007). In addition, changes of ±0.1 in the $aTiO_2$ activities will introduce an uncertainty of approximately -1.66% (-12.4 °C) / +1.97% (14.7 °C) in calculated temperatures for the studied zircons. It is important to remember that Ti in zircon temperature gives zircon crystallisation temperature rather than the liquidus temperatures.

The temperatures obtained for the deposits are summarised in Table 2.3 and plotted against age in Figure 2.15 A and B.

Table 2.3: Summary statistics for Ti-in-Zr thermometry for each area. Temperatures are in °C.

Deposit	N	Minimun	Maximun	Average	SD	Median	MAD
Penacho Blanco	195	628	870	770	±42	773	±34
Polo Sur	141	619	885	730	±46	730	±48
TYC	36	625	875	676	±48	671	±33
Unrelated	35	656	868	749	±56	747	±48

N = number of zircon, SD = standard deviation, MAD= median absolute deviation

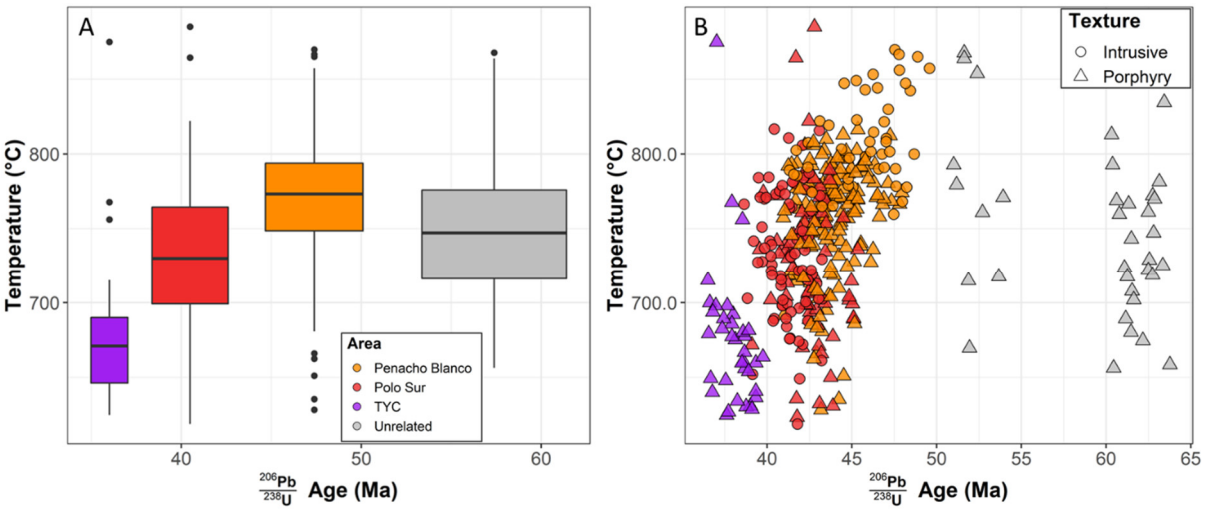

Figure 2.15: A) Temperature vs $^{206}Pb/^{238}U$ age boxplot diagram. B) Temperature vs $^{206}Pb/^{238}U$ Age scatterplot for individual zircon values.

The temperature values range from 885 °C to 619 °C for ore related samples with a median values of 773 °C, 730 °C and 671 °C for Penacho Blanco, Polo Sur and TYC porphyry respectively (Figure 2.15 A). The unrelated group Ti in zircon temperatures span from 656 °C to 867 °C with a median of 747 °C. Individual temperatures from ore related samples show an overall decrease in temperature for younger zircons. In contrast, the unrelated samples do not show any trend (Figure 2.15B).

2.5.2 Ce^{4+}/Ce^{3+} ratios

The summary statistic for the ratio Ce^{4+}/Ce^{3+} are shown in Table 2.4 and illustrated in Figure 2.16 A, B and C.

Table 2.4: Summary statistics for Ce^{4+}/Ce^{3+} ratio for each area.

Deposit	N	Minimun	Maximun	Average	SD	Median	MAD
Penacho Blanco	195	0.3	372	38	±51	19	±21
Polo Sur	141	3.0	459	66	±65	42	±41
TYC	36	88.0	1722	436	±321	397	±230
Unrelated	35	1.0	877	126	±169	72	±77

N = number of zircon, SD = standard deviation, MAD= median absolute deviation.

The Ce^{4+}/Ce^{3+} ratios vary from 0.27 to nearly 1721 among the deposits. The analysed samples show steadily increases as deposits become young, with and a median value of 19 for Penacho Blanco, 41 for Polo Sur and 321 for TYC (Fig A). Similar results are illustrated by

individual zircon results, where Ce^{4+}/Ce^{3+} ratios increase in a continuous trend towards younger ages, from Penacho Blanco to the TYC porphyry. Ce^{4+}/Ce^{3+} ratios in samples unrelated to ore vary from 1 to 876 with a median of 72 with no clear trend for individual analysis.

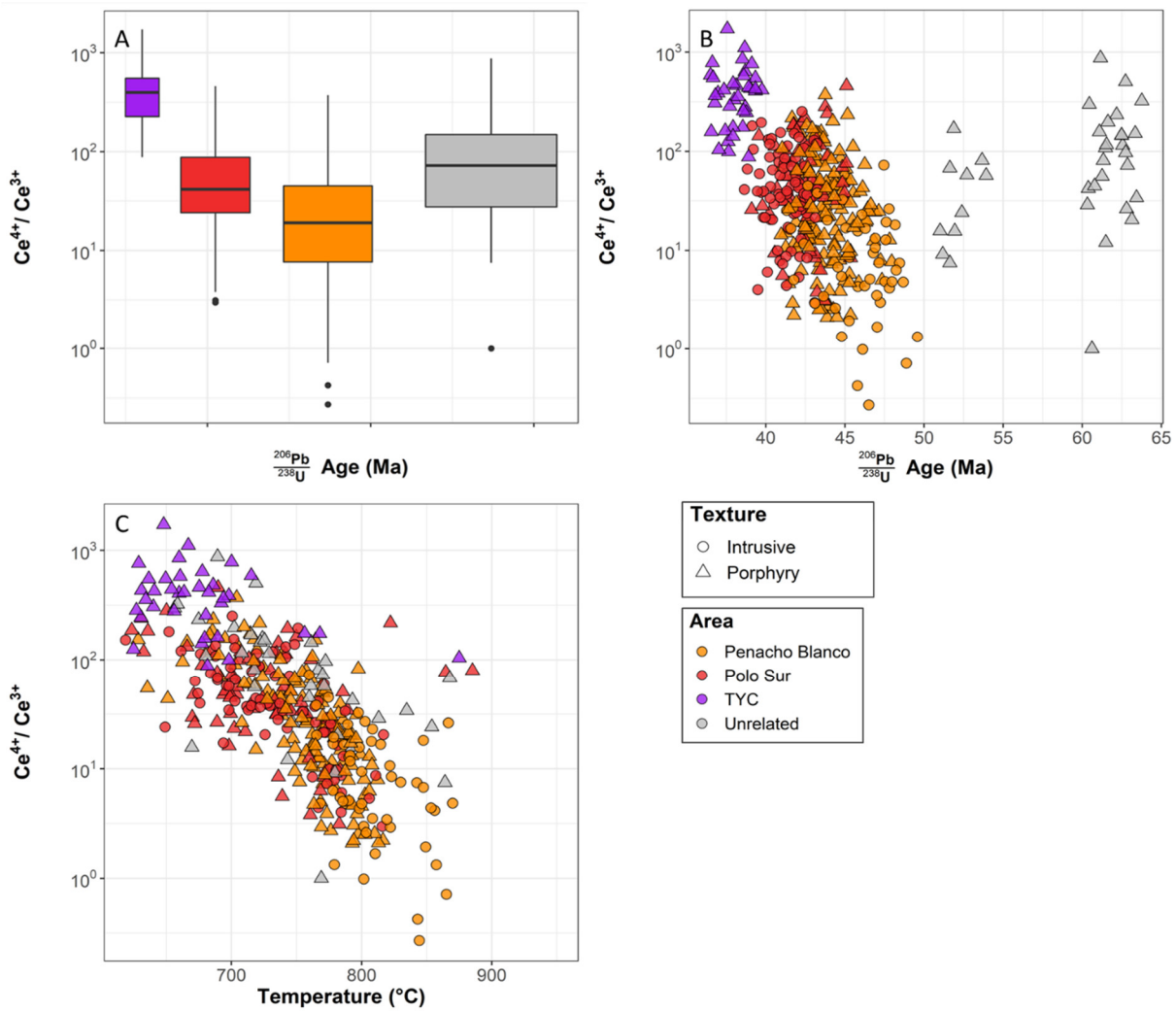

Figure 2.16: A) Ce^{4+}/Ce^{3+} ratios vs $^{206}Pb/^{238}U$ Age boxplot diagram. B) Ce^{4+}/Ce^{3+} ratio vs $^{206}Pb/^{238}U$ Age scatterplot for individual zircon values. C) Ce^{4+}/Ce^{3+} vs temperature scatterplot for individual zircon values.

2.5.3 Europium anomaly

Europium anomalies(Eu/Eu*) calculated as the chondrite-normalised values of Eu_N, divided by the geometric mean of Gd_N and Sm_N [$Eu^* = Eu_N/(Gd_N*Sm_N)^{0.5}$]. The results are summarised in Table 2.5 and plotted against age and Ti-in-zircon temperature in Figure 2.17 A, B and C.

Table 2.5: Summary statistics for Eu* for each area.

Deposit	N	Minimum	Maximum	Average	SD	Median	MAD
Penacho Blanco	195	0.09	0.48	0.32	±0.05	0.33	±0.04
Polo Sur	141	0.16	0.67	0.44	±0.07	0.44	±0.07
TYC	36	0.51	0.83	0.62	±0.08	0.62	±0.07
Unrelated	35	0.30	0.81	0.45	±0.13	0.40	±0.10

N = number of zircons, SD = standard deviation, MAD = Median absolute deviation.

The anomaly values from the ore related samples vary from 0.09 to 0.83 with median values of 0.33, 0.44, 0.62 for Penacho Blanco, Polo Sur and TYC, respectively, with Eu/Eu* decreasing as the deposits become young. Individual analyses reveal a marked increase in Eu/ Eu* as the zircons from the ore-associated samples become younger zircons and Ti-in-zircon temperatures also decrease, whereas the samples not related to ore do not show either of these trends.

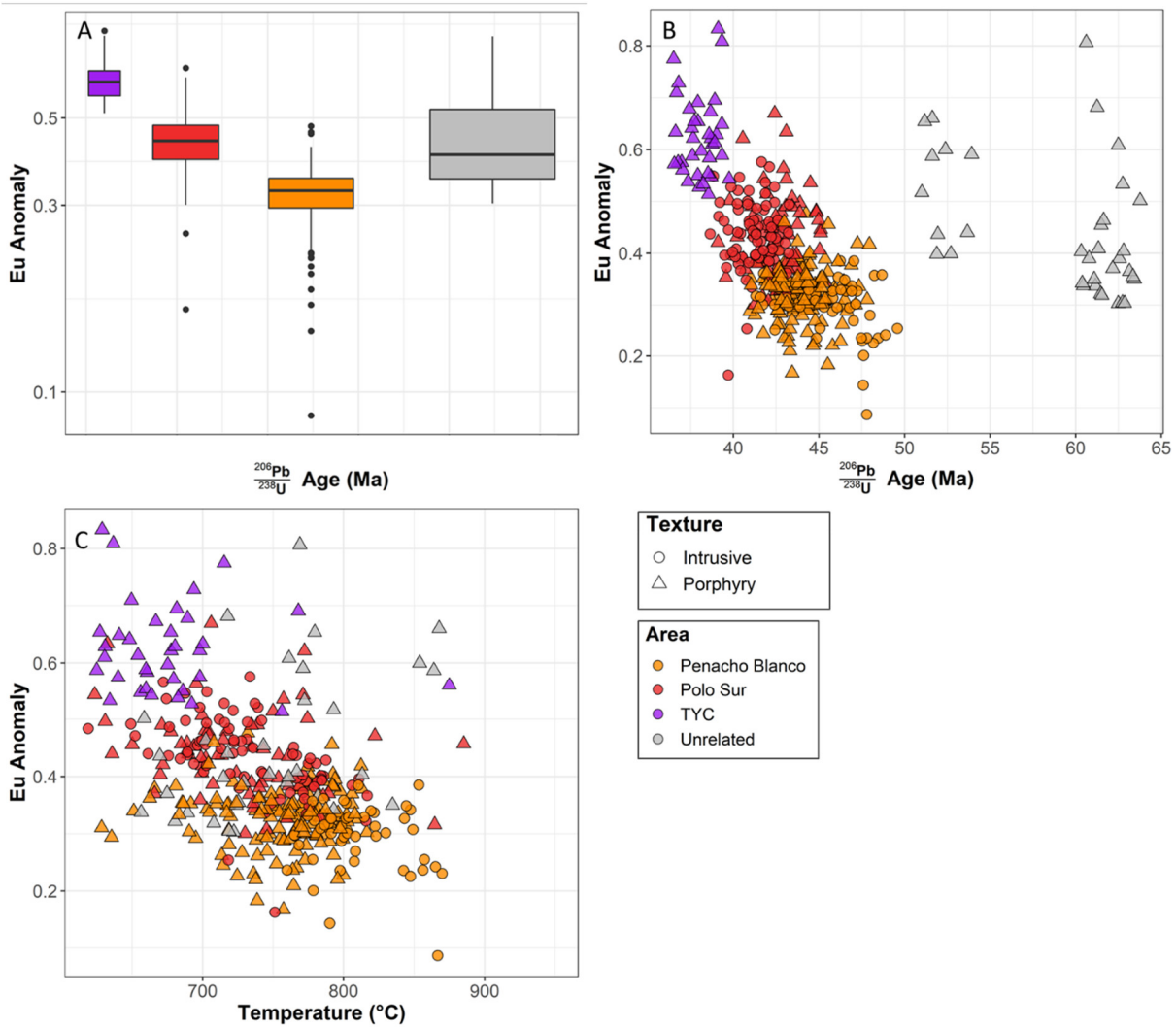

Figure 2.17: A) Eu/Eu* anomaly vs $^{206}Pb/^{238}U$ Age boxplot diagram. B) Eu anomaly ratio vs $^{206}Pb/^{238}U$ Age scatterplot for individual zircon values. C) Eu anomaly vs temperature scatterplot for individual zircon values.

2.5.4 Oxygen isotopes

The summary results for each deposit are presented in Table 2.6, and the results for individual grains are illustrated in Figure 2.18 A and B.

Table 2.6: Summary statistics for $\delta^{18}O_{VSMOW}$ (‰) for each area.

Deposit	N	Minimum	Maximum	Average	SD	Median	MAD
Penacho Blanco	49	5.00	7.89	5.84	±0.47	5.77	±0.31
Polo Sur	25	5.25	7.81	6.06	±0.63	5.82	±0.36
TYC	7	5.10	6.25	5.57	±0.38	5.58	±0.24
Unrelated	10	5.39	7.00	5.91	±0.52	5.73	±0.37

N = number of zircons, SD = standard deviation, MAD = Median absolute deviation.

The $\delta^{18}O_{VSMOW}$ values vary from 5.00 ‰ to 7.89 ‰. Most of the samples have mantle-like values (5.3 ‰. ± 0.6, 2σ; Valley, 2003) except for the sample 353363 with values that ranges from 5.67 to 7.80 ‰ with an average value of 6.95 ‰. Inherited zircons have $\delta^{18}O_{VSMOW}$ values from 4.75 up to 6.98 ‰, with an average close to mantle-like values of 5.84 ‰.

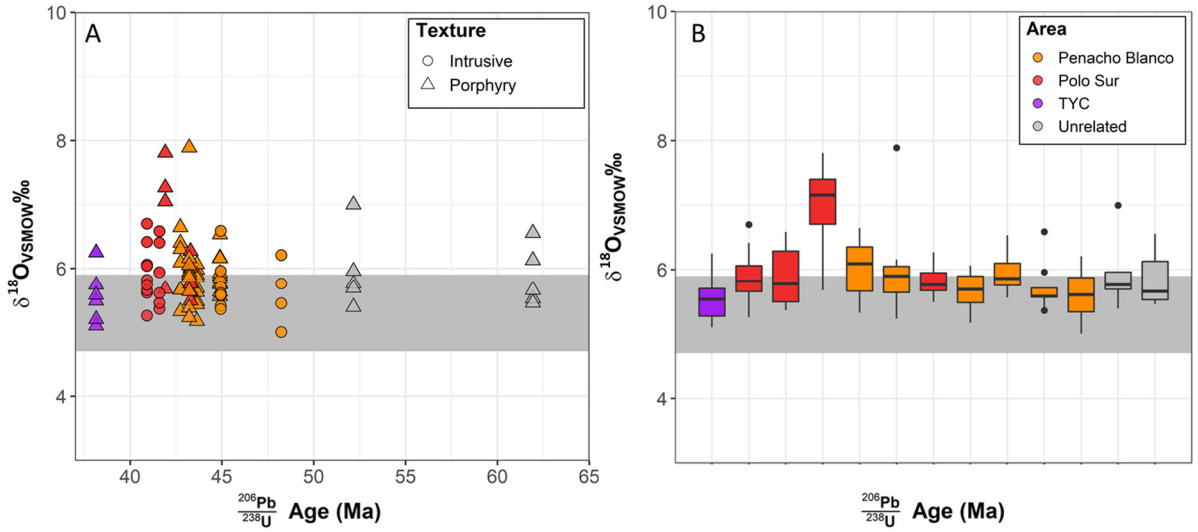

Figure 2.18: A) Oxygen isotopes vs $^{206}Pb/^{238}U$ age scatterplot for analysed samples. Age corresponds to the weighted mean of $^{206}Pb/^{238}U$ age for each sample. B) $\delta^{18}O_{VSMOW}$ boxplot chart by sample, ordered by $^{206}Pb/^{238}U$ age.

Chapter 3: Discussions

3.1 Introduction

This chapter, which discusses the results, is divided into four parts. The first section reviews the effects of hydrothermal alteration and its impact on the whole rock geochemistry. The second discusses the PGE behaviour and their relationship to sulfide saturation and magmatic evolution. The third will comment on the use of zircon as a fertility indicator. Finally, the temporal evolution and genesis of Polo Sur and Penacho Blanco deposits will be discussed.

3.2 The effects of hydrothermal alteration

The porphyritic environment is characterised by hydrothermal alteration, which can obliterate the primary magmatic minerals, and overprint the original geochemistry (Ulrich and Heinrich, 2002; Sillitoe, 2010). Despite care in selecting the least altered samples, and avoiding visible veins, it is impossible to completely remove the effect of the hydrothermal alteration, which in addition to the presence of phenocryst, may bias estimates of the composition of the melt. In addition, uncommon Pd bearing minerals have been reported as nano-inclusion of hydrothermal copper sulphides associated with potassic alteration and pyrite in Rio Blanco-Los Bronces and Greek porphyry copper deposits (Economou-Eliopoulos and Eliopoulos, 2000; Crespo et al., 2018) that can bias the results from PGE. Thus, it is crucial to evaluate the degree of alteration of the studied samples and its effects on the whole rock geochemistry.

The effects of the alteration on the samples are reflected in the whole rock geochemistry, especially K_2O, Na_2O and CaO, which are scattered when plotted against MgO concentration. Potassium shows a marked increase with decreasing MgO at around 1.0 wt.% MgO (Figure 2.7B), which coincides with the samples that have potassic alteration and the occurrence of "A" and "B" type veinlets in the Penacho Blanco and TYC areas. The highest K_2O values are related to the samples from the TYC area, which are also those that show the highest degree of this alteration (Figure 2.4). Sodium and calcium show an overall decrease with decreasing MgO but the data are scattered. The causes for this scatter is in part due to the effect of phenocrysts, but also to replacement of plagioclase by potassic feldspar (Figure 2.4A).

Mass balances calculations for altered samples and their 'fresh' or least altered equivalents from the Bajo de la Alumbrera Cu-Au porphyry in Argentina have shown that hydrothermal alteration can remove or add nearly -1.0 to 2.0 grams of K_2O per 100g of fresh rock, -0.5 to 2.2 g/100g of Na_2O and -3.3 to 0.5 g/100g of CaO (Ulrich and Heinrich, 2002). Silica addition (or subtraction) can vary from -7.9 to nearly 300 g/100g of rock. The significant increase in SiO_2 is due to quartz veins filling spaces, e.g. "B" type veins. Thus, SiO_2 is not a suitable variable for tracing fractional crystallisation among the suites if the effects of alteration in the Centinela District porphyries are similar to those observed at Bajo de la Alumbrera. "A" and "B" veins have been observed at the sample scale and thin veinlets arrays are also present. Therefore, MgO concentrations were used as an indicator magmatic fractionation since its variation due to alteration is expected to be small, based on the observed difference of -0.4 to 0 g of MgO per 100g between altered and unaltered rocks from Bajo de la Alumbrera.

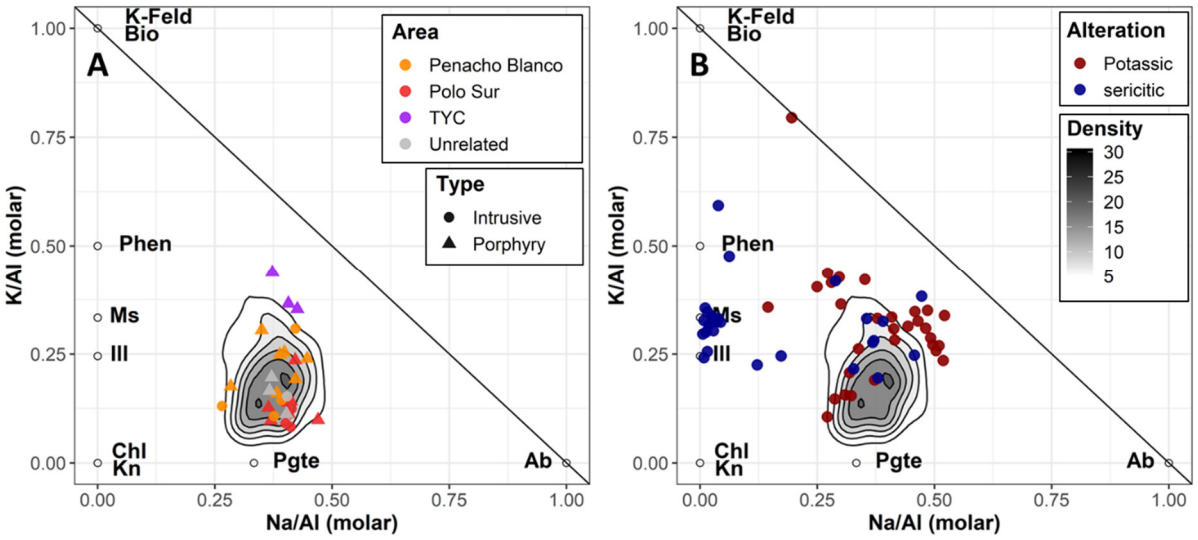

Figure 3.1: General element ratio diagrams of molar K/Al plotted against molar Na/Al. The contours lines indicate the density of the unaltered Andean samples(GeoRock, Sarbas and Nohl, 2008) that have a similar composition to those from Centinela District porphyries. A) Samples from Centinela District, this study. B) Samples with phyllic (sericitic) alteration from Northparkes and Bajo de la Alumbrera porphyry copper deposits (data from Ulrich and Heinrich, 2002 and Pacey et al., 2019). Red and blue coloured dots refer to samples with potassic and sericitic alteration, respectively. K-feld: potassic feldspar. Bio: biotite. Phen: phengite. Ms: muscovite. Ill: Illite. Chl: Chlorite. Kn : Kaolinite. Pgte: Paragonite. Ab: Albite.

The effect and extent of alteration on the geochemistry of the analysed samples were evaluated by plotting K/Al (molar) vs Na/Al (molar) (Davies and Whitehead, 2006; Escolme et al., 2019) and comparing the results to unaltered Andean Arc rocks from the GeoRock database (Sarbas and Nohl, 2008), filtered so that the range plotted is the same as those of the analysed samples. The stoichiometric ratios of K, Na and Al indicate the nature of the alteration minerals. The samples that have undergone potassic alteration will shift towards the K-feldspar/biotite

node, those with calc-sodic alteration will move to the albite node, and phyllic altered samples will be displaced towards the sericite/phengite/illite node.

Figure 3.1A shows a K/Al vs Na/Al ratio diagram for the samples analysed in this study and Figure 3.1B shows samples with potassic and phyllic alteration from the Northparkes District (Pacey et al., 2019) and Bajo de la Alumbrera porphyry Cu-Au deposit (Ulrich and Heinrich, 2002) where alteration is moderate to strong. The samples from the area of study fall close to the average composition of Andean plutonic rocks, although the TYC and some of Penacho Blanco samples are shifted slightly to the potassic feldspar node. Another group from Penacho Blanco is displaced slightly towards the muscovite, illite and chlorite nodes. This is consistent with the moderate potassic alteration represented by the replacement of plagioclase by K-feldspar in TYC porphyries and the phyllic, chlorite-sericite and potassic alteration in some of the Penacho Blanco samples. The dispersion of the samples from Penacho Blanco and TYC that fall in the outer part of the average Andean composition correlates with the most scattered samples observed in Figure 2.6 and Figure 2.7B

The decrease in titanium and iron with the decreasing MgO content is attributed to titanomagnetite fractionation, which was confirmed by thin section observation. However, magnetite and rutile are also typical products of potassic and calc-sodic hydrothermal alteration in porphyritic systems (Sillitoe, 2010). Furthermore, phyllic and argillic alteration are magnetite destructive (Sillitoe, 2010), which can lead to an underestimation of the iron content of the original rock composition. Therefore, it is necessary to assess the possibility of hydrothermal addition or destruction of magnetite when assessing the bulk geochemistry of a sample.

High V/Sc ratios can be used as an indicator of magnetite alteration (related to the early stages of the porphyry development) because the partition coefficient of V in this magnetite is higher than Sc (ca. 54 and 3.3 respectively, Escolme et al. 2019 and reference therein). The average V/Sc ratio in unaltered volcanic rocks is nearly 8:1 (Escolme et al. 2019), whereas altered rocks from Bajo de la Alumbrera have ratios of up to 20 and La Productora porphyry copper deposit in northern Chile (Ulrich and Heinrich, 2002; Escolme et al., 2019) has even higher V/Sc. Thus, any V/Sc value above eight might be interpreted as indicating the addition of iron as hydrothermal magnetite (Escolme et al. 2019).

Most of the samples from the Centinela district show a correlation between V and Sc with a slope of 9:1, slightly higher than the reference value of 8:1 for unaltered volcanic rocks (Figure 3.2A). Figure 3.2B shows the variation of V/Sc with iron content. There is a slight increase for

samples from Polo Sur and Penacho Blanco as iron increases, but most of the data lie close to the 8:1 V/Sc ratio, except for two samples from TYC area that have V/Sc ratios of ca. 10 and 12 at similar Fe_2O_3 concentrations.

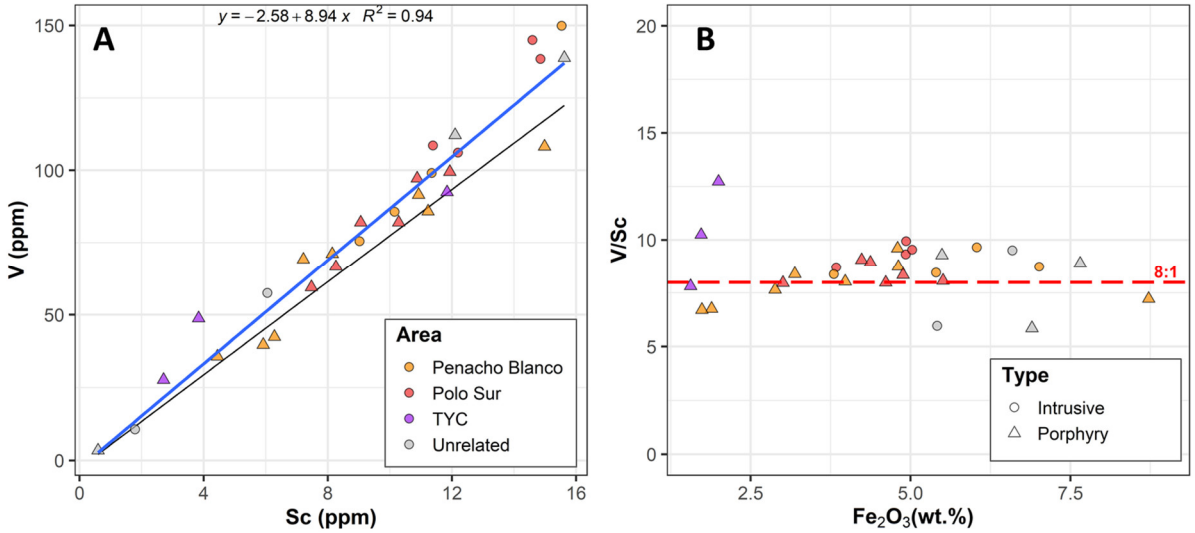

Figure 3.2: A) V vs Sc diagram. The black line shows an 8:1 slope and the blue line is a least-squares linear fit. The equation for the fit is given at the top of the diagram. B) V/Sc ratio vs Fe_2O_3. The red dashed line indicates a V/Sc ratio of 8.

Most of the analysed samples plot within or close to a normal composition range for Andean rocks in Figure 3.1, and have V/Sc ratios that are at, or only slightly above 8 in Figure 3.2, which indicates that they have not undergone an intense magnetite alteration nor have gained or lost significant iron during alteration.

If Pd, Pt and other PGEs are carried by the same hydrothermal fluids and hosted in Cu-sulphides or pyrite as it has been observed in other porphyry copper deposits (Economou-Eliopoulos and Eliopoulos, 2000; Crespo et al., 2018), it would be expected to observe a correlation between these elements and Cu and Au. There is no correlation between Pd and Pt with Cu in both deposits and there is a very weak correlation between Pd and Au in Polo Sur deposits.

Pd and Cu data from Polo Sur deposit have a Pearson correlation coefficient of 0.59 and an R-squared value 0.30 whereas Pd and Au have a correlation coefficient of 0.78 and an R-squared value of 0.60. This is not nearly strong as Cu and Au that have a correlation of 0.94 and R^2 of 0.9. This suggests several possibilities: i) Pd is not carried by hydrothermal fluids, ii) Pd is carried by different fluids than those that carried gold and cooper or iii) Pd might be reflecting processes that are not hydrothermal iv) geochemical signature of magmatic and hydrothermal processes is mixed. Unfortunately, the data is not enough to draw any of these conclusions.

3.3 PGE geochemistry as fertility indicators

It has been suggested that platinum group elements (PGE) can be used as an indicator of porphyry system fertility (Park et al., 2015; Cocker et al., 2015; Hao et al., 2017; Lowczak et al., 2018; Hao et al., 2019; Park et al., 2019). This section evaluates the use of PGE geochemistry as an indicator of porphyry fertility in the Centinela district.

It has been shown that Ir, Ru, Rh and Pt can behave as compatible elements prior to sulphide saturation because of the precipitation of an Ir–Ru–Rh bearing Pt-Fe alloy (Park et al., 2013a). In contrast, Cu, Au, Re and Pd behaves as incompatible elements before sulphide saturation but behave as compatible elements once the magma becomes sulphide saturated (Park et al., 2013a; Park et al., 2015). Copper and Au show a scattered pattern when plotted against MgO because their concentrations can be influenced by the presence of hydrothermal sulphides. Furthermore, the excellent correlation between Cu and Au, which has log-linear correlation coefficient of 0.94 (Figure 2.9E), suggest both elements were introduced by the same fluid. Thus, Cu and Au concentrations do not reflect magmatic processes. Therefore, Pd is the most appropriate element to identify the onset of sulphide saturation because it accumulates in the melt prior to sulphide saturation and then drops abruptly once the magma becomes sulphide saturated. Furthermore, it does not partition into metal alloys and is much less affected by hydrothermal fluids than Cu or Au (Keays, 1995; Park et al., 2013a; Park et al., 2015; Park et al., 2019).

Penacho Blanco shows a trend of decreasing Pd and Pt with decreasing MgO with no visible break, indicating that the onset of sulphide saturation started before the MgO content of the melt fell below 3.7 wt.%, the MgO content of the analysed sample with the highest MgO (Figure 3.3A, Figure 2.14A). Trends for the Polo Sur deposit are questionable. Platinum shows no trend but Pd appears to increase with decreasing MgO (Figure 3.3A, Figure 2.14B). However, the limited compositional range of the samples analysed from this deposit, which covers a MgO variation of only 1 wt. %, and the presence of nuggets in some of the samples makes interpretation difficult.

Figure 3.3 compares Pd vs MgO for Penacho Blanco and Polo Sur with Cadia, El Abra and Northparkes. The rate of decrease in Pd with decreasing MgO at Penacho Blanco is higher than Cadia (Lowczak et al., 2018) but lower than for El Abra (Cocker et al., 2015). However, the Pd concentrations at the time the ore porphyries formed (1 to 2 wt.% MgO) at Penacho Blanco and El Abra are similar. The concentrations of Pd in the low MgO samples from the Northparkes Cu-Au bearing porphyry are one to two orders of magnitude higher (Hao et al., 2017) than at El Abra and Penacho Blanco at comparable MgO contents, but similar to those observed in the most felsic

rocks from Polo Sur deposit. Cadia is an unusual case because sulphide saturation occurred at an early stage of its magmatic evolution, but the amount of sulphide exsolved was too small to influence the chalcophile element budget (Lowczak et al., 2018). Cadia Pd abundances are one order of magnitude higher than those observed at Penacho Blanco, but similar to the lowest MgO content samples from Polo Sur. The slope of the Penacho Blanco Pd vs MgO trend line, which is intermediate between the Cadia and El Abra trends (Figure 3.3), suggests that the amount of sulphide to precipitate from the Penacho Blanco magma was greater than Cadia but less than El Abra. This amount of sulphide was enough to deplete most of the gold from the evolving magma, but not the copper, which led to the formation of a copper dominated deposit.

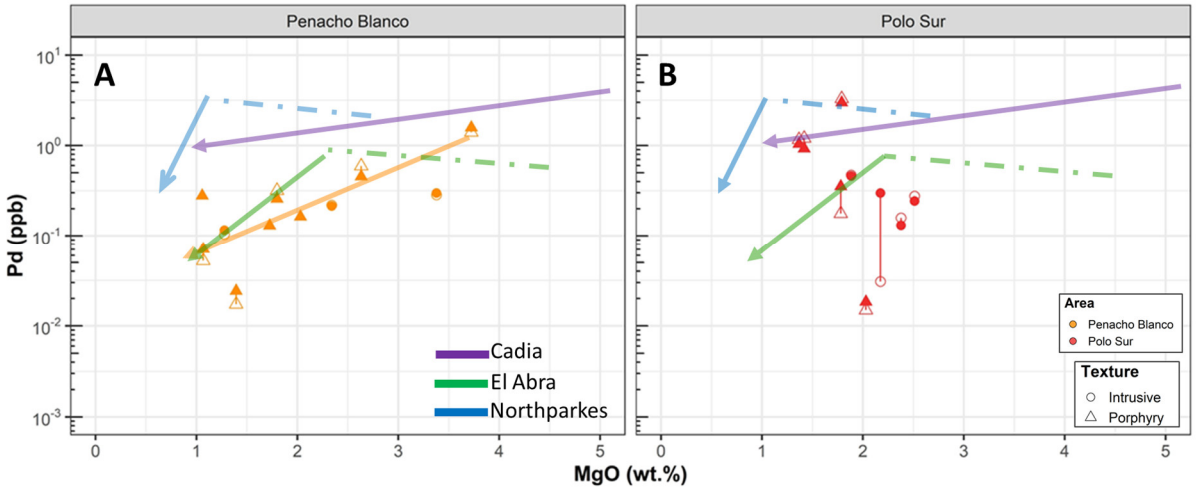

Figure 3.3: Comparison of Pd vs MgO with El Abra Cu-Porphyry deposit, Northparkes and Cadia Cu-Au district. The figures from the respective papers can be found in Appendix 2. A) Penacho Blanco deposit. B) Polo Sur deposit.

Park et al. (2019) suggested that the Pd content of the porphyries, normalized to their MgO content to correct the differences caused by fractional crystallization, plotted against the ratio of Pd/Pt, can be used to distinguish between barren and ore-bearing suites, and in the case of ore-bearing suites, to separate Cu-Au from Cu-only deposits for porphyries with MgO <2.5 wt. %. Hao et al. (2019) used a similar diagram for samples from La Escondida District in Northern Chile but replaced the Pd/Pt ratio with the Y concentration as an indicator of water content of the melt (Richards and Kerrich, 2007; Richards, 2011).

Figure 3.4 shown data for plutonic rocks with <2.5 wt. % MgO for different deposits plotted on the discrimination diagrams of Park et al. (2019, Figure 3.4A) and Hao et al. (2019, Figure 3.4B). The ore-bearing suites plotted are El Abra (Cu), Northparkes (Cu-Au), Grasberg (Cu-Au-Pd rich), Cadia (Au-Cu), Escondida (Cu), Zaldívar (Cu), and Chuquicamata (Cu, only PGE data), and the barren suites are Rachaite Suite, Sanyo-Ryoke magnetite series and Sanin Ilmenite series

(only PGE data), Boggy Plain zoned pluton and the Goonumbla and Woombin barren suites from Northparkes (Park et al., 2013b; Cocker et al., 2015; Cocker, 2016; Hao et al., 2017; Lowczak et al., 2018; Hao et al., 2019; Park et al., 2019). The compiled data in Figure 3.4 A show that Cu, Cu-Au and Cu-Au-(Pd) porphyries define different groups. Figure 3.4 B indicates that Cu-dominant porphyries evolve to low Y and low Pd/MgO ratios, whereas Cu-Au and Cu-Au-Pd rich shift to low Y and high Pd/MgO.

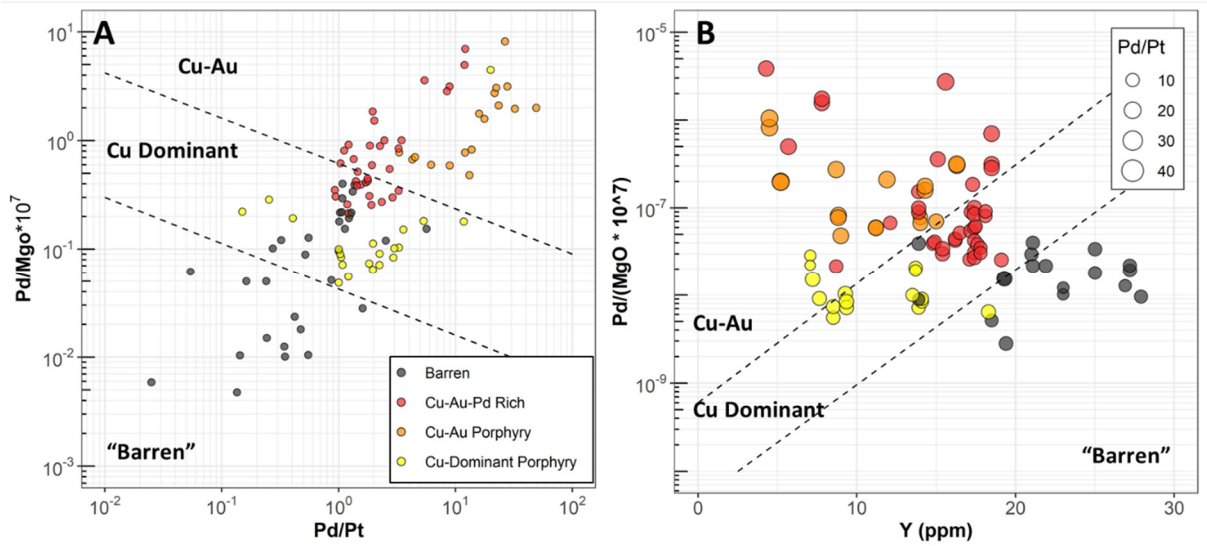

Figure 3.4: A) Chalcophile element discrimination diagram from Park et al. (2019) and B) Barren-fertile discrimination diagram from Hao et al. (2019). Size indicates the ratio between Pd/Pt. Data are from (Park et al., 2013b; Cocker et al., 2015; Cocker, 2016; Hao et al., 2017; Lowczak et al., 2018; Hao et al., 2019; Park et al., 2019). Division lines are plot from Park et al., (2019) and Hao et al. (2019).

The samples from Centinela district are plotted in Figure 3.5. Overall, they agree with the discrimination diagrams of Park et al. (2019) and Hao et al. (2019), and for both diagrams, most of the samples plot in the Cu-dominant porphyry field. A group of Polo Sur outliers fall in the Cu-Au area which may be related to sub-economic amounts of gold (0.06 g/t) that have been reported in sulphides from this deposit (Antofagasta Minerals PLC, 2017). Although it is not possible to identify the onset of the sulphide saturation in the studied suites, their geochemistry still reflects the processes involved in the formation of porphyry copper deposits. Most samples fall in the Cu-only field on both diagrams, with the Park et al. (2019) diagram discriminating the Cu-Au field from the Cu-dominant field better than the Hao et al. (2019) diagram.

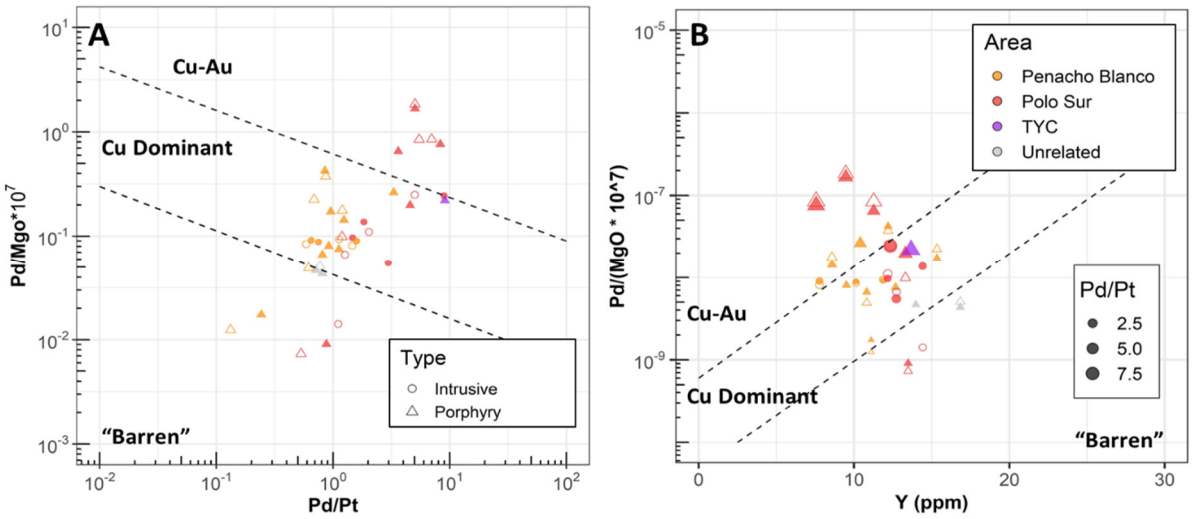

Figure 3.5: Data for samples from this study. Open symbols indicate duplicates analysis. A) Chalcophile element discrimination diagram from Park et al. (2019) and B) Barren-fertile discrimination diagram from Hao et al. (2019). Size of data points indicates the Pd/Pt ratio.

3.4 Zircon as fertility indicators.

Zircon geochemistry has been proposed as an indicator of fertility with emphasis on the use of Ce/Ce*, Ce^{4+}/Ce^{3+} and Eu/Eu* ratios (Ballard et al., 2002; Lu et al., 2016; Loader et al., 2017). The variations of these ratios reflect changes in temperature and/or redox state of the magma (Burnham and Berry, 2012; Loucks et al., 2018). Zircons formed in a more oxidizing environment will have higher Ce/Ce* and Eu/Eu*, conditions that also promotes the oxidation of S as sulphate, that allows chalcophile elements to remain available in the melt to later stages (Ballard et al., 2002; Jugo et al., 2010; Lu et al., 2016; Loader et al., 2017).

S-type granites can dissolve more apatite than I-type intrusions and, as a consequence, zircons from S-type granites have more P in their lattice than those from I-types (Chappell, 1999; Zhu et al. in review). Phosphorous provides a charge balance for ∑REE+Y so these elements are also more abundant in S-type granite zircons (Chappell, 1999; Burnham and Berry, 2017). Empirical observations for zircons from porphyry copper deposits indicate that they are depleted in P relative to zircons from barren intrusions, possible because the role of P in charge balancing ∑REE + Y is largely displaced by water.

Zhu et al. (in review) have compiled a global database of nearly 7000 detrital zircon from Earth's major rivers. Since porphyry copper deposits are rare (Richards, 2013), it is reasonable to assume that most of the river zircons were derived from rocks that are not associated with ore-bearing porphyry intrusions. Therefore, this database serves as a proxy for zircons from barren intrusions.

Data from a further five hundred zircon data from Chuquicamata, Dexing, El Abra, Radomiro Tomic, Toki, Grasberg, Teniente (no P data), and Centinela porphyry copper deposit districts (Ballard et al., 2001; Ballard et al., 2002; Muñoz et al., 2012; Cocker et al., 2015; Cocker, 2016; Zhang et al., 2017; this work) were also compiled for this study and classified as syn-mineralization (intrusions associated with the main mineralization event) and post-mineralization porphyries (intrusions emplaced after the main mineralization event, usually barren or subeconomic), intrusions that are precursors to the ore-forming events (related magmatism that preceded the ore formation event) and barren.

The global river zircon database lacks data for some of the REE so Zhu et al. (in review) calculated the missing REE values by a method based on the lattice strain model (Onuma et al., 1968; Blundy and Wood, 1994; Burnham and Berry, 2017) to calculate values for Ce/Ce* and Eu/Eu*. The ore deposits dataset, on the other hand, was compiled using the geometric mean ($Ce/Ce^* = Ce_N/(La_N * Pr_N)^{0.5}$ and $Eu/Eu^* = Eu_N/(Sm_N*Gd_N)^{0.5}$). The two methods of calculating Ce/Ce* and Eu/Eu* give systematically different results, which must be reconciled. Fortunately, the data of Burnham and Berry (2017) for I and S type intrusions (n=145 zircons) can be used to demonstrate a simple log-linear relationship between the two variables with excellent correlation coefficients of 0.998 and 0.993 and an R^2 fitting of 1 and 0.99 for Ce/Ce* and Eu/Eu* respectively. Therefore, Ce/Ce* and Eu/Eu* ratios from ore data set have been transformed lattice strain equivalent using the constants derived from the log-linear regression.

Figure 3.6 illustrates the results of the compiled data. The grey contours show the multivariate probability density function of the river data, which are overlayed by the ore-deposit data. Most of the ore-related porphyry zircons have Eu/Eu* >0.4, as previously proposed by Ballard et al. (2002), Ce/Ce* > 100 and P < 5 μmolg−1, whereas half to a quarter of the precursor and skarn related zircons, and most of the zircons from barren intrusions, fall outside this range. The highest concentration of river data is offset from the ore deposit dataset, and in particular, there is a clear difference from respect to the molar P values. Therefore, zircons that fell within Eu/Eu* >0.4, Ce/Ce* > 100 and P < 5 $\mu molg^{-1}$are likely to have crystallized from fertile magma.

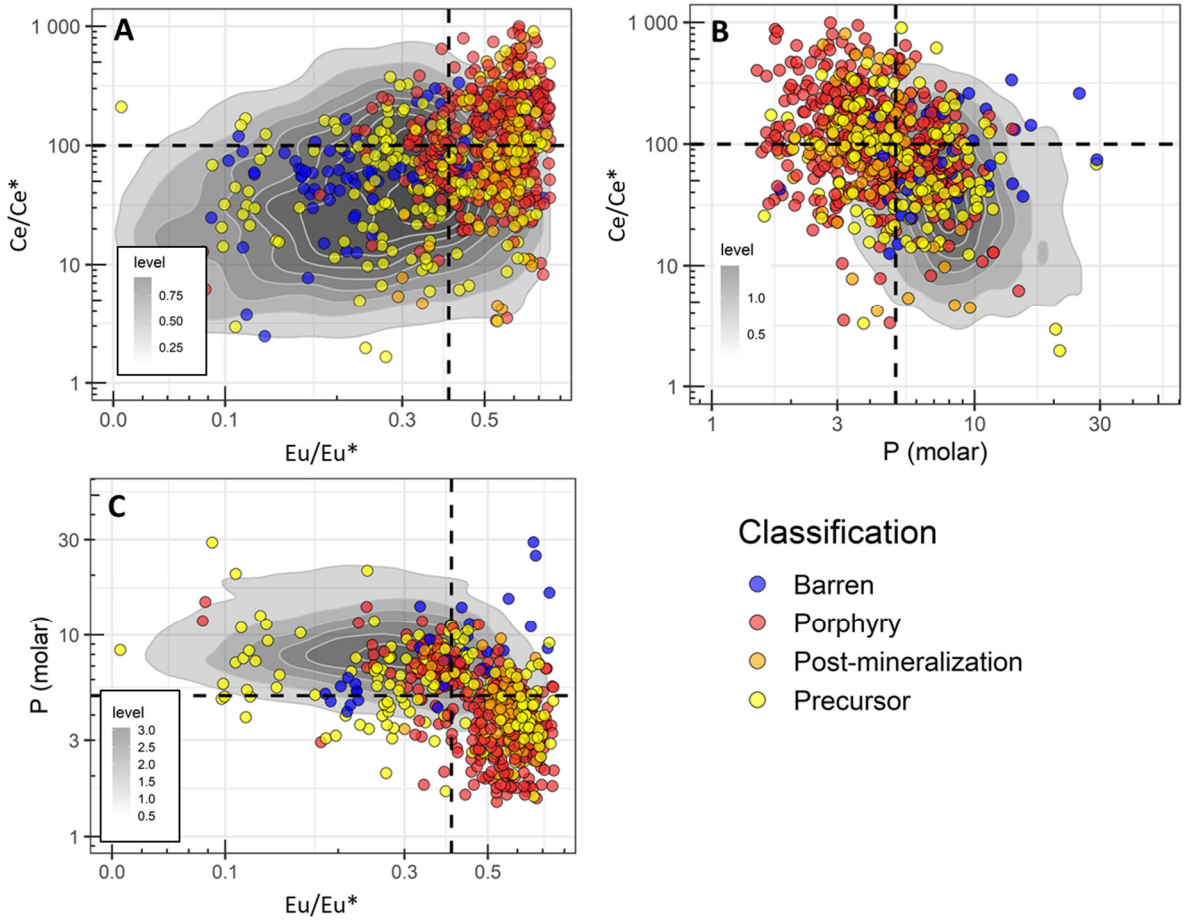

Figure 3.6: Zircon fertility discriminator diagrams for compiled data from Chuquicamata, Dexing, El Abra, Radomito Tomic, Toki, Grasberg, Teniente (no phosphorus data), and Centinela Porphyry copper deposit districts (Ballard et al., 2001; Ballard et al., 2002; Munoz et al., 2012; Cocker et al., 2015; Cocker, 2016; Zhang et al., 2017, this work). Grey shaded contours show zircons from the river database of Zhu et al. (in review). A) Ce /Ce* vs Eu/Eu*. B) Ce/Ce* vs molar P. C) Molar P vs Eu/Eu*.

Figure 3.7 compares the zircons analysed for this study with the global river data set. The Penacho Blanco zircons mostly overlap with the river data, whereas the Polo Sur and especially the TYC zircons shift towards the fertile zircon field. A small number of the unrelated group (nearly ~1.3% of total zircons), with low molar P, fall within the fertile group. The trend of Penacho Blanco to Polo Sur to TYC, seen in Figure 3.7 A, B and C, is similar to that observed in oxygen fugacity (Figure 3.12) and may represent a trend of increasing fertility as the porphyries become younger and more fractionated. I suggest that TYC is the most prospective of the porphyries but unfortunately it is too deep to be a serious exploration target.

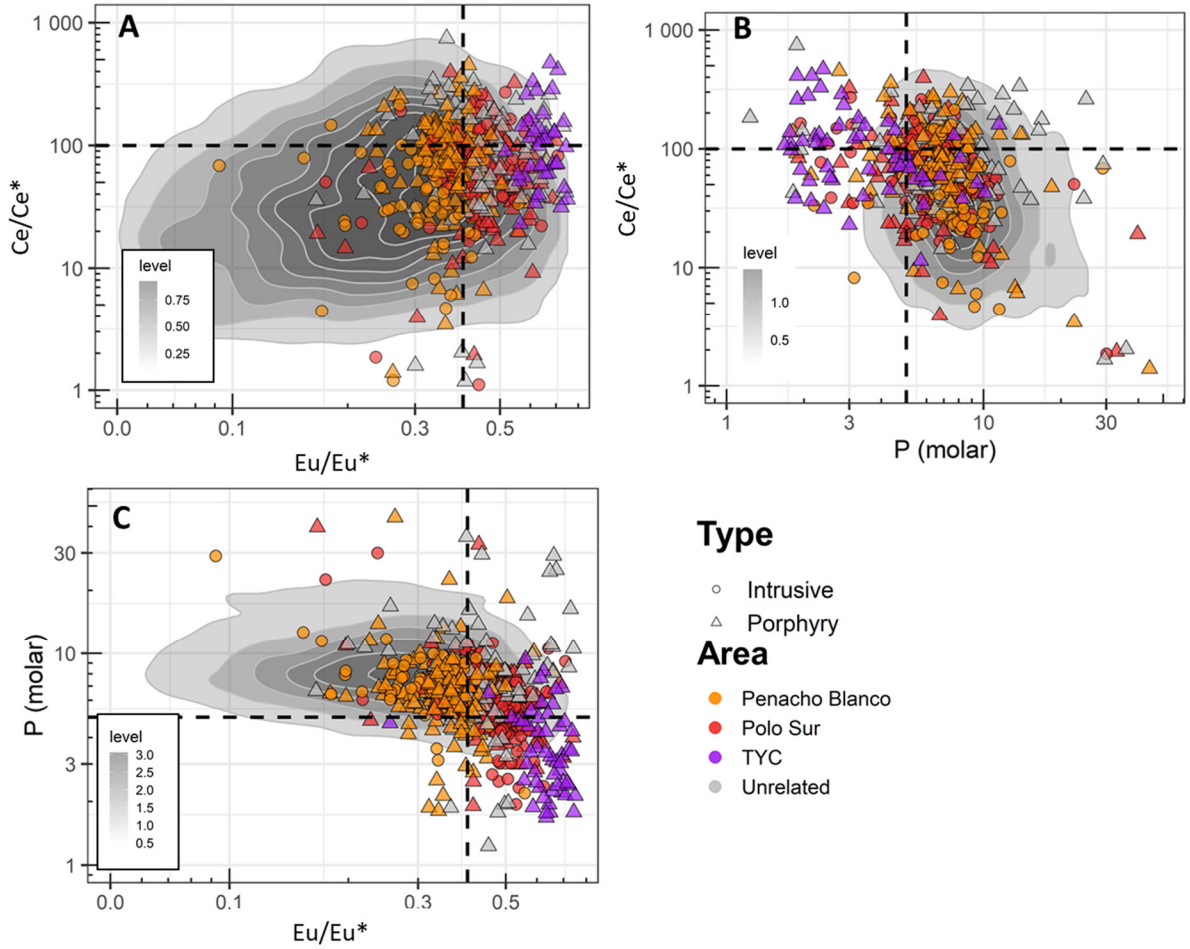

Figure 3.7: Zircon fertility discriminator diagrams for Centinela District samples. Grey shaded contours represent the river database from Zhu et al. (in review). A) Ce /Ce* vs Eu/Eu*. B) Ce/Ce* vs molar P. C) Molar P vs Eu/Eu*.

3.5 Temporal and magmatic evolution of the deposits.

3.5.1 Length of the magmatic activity.

Previous reported U-Pb zircon ages for the porphyries from the Centinela District deposits are 45-44 Ma for Penacho Blanco, 42-41 Ma for Polo Sur and 39-38 for the TYC deposit (Mpodozis and Cornejo, 2012). The ages obtained in this work extend the lower age limit for Penacho Blanco to 42.7 ± 0.4 Ma (sample 353358) and the upper limit for Polo Sur area to 43.3 ± 0.5 Ma (sample 353362). The ages describe a continuous trend that goes from 44.9 ± 0.6 Ma at Penacho Blanco to 40.9 ± 0.4 Ma (Figure 3.8). There is a gap between 41 to 39 Ma between Polo Sur and the TYC porphyries, that coincides with the ages reported for the porphyry copper deposits of Encuentro (42-41), Esperanza (42-40) and Mirador (41-39).

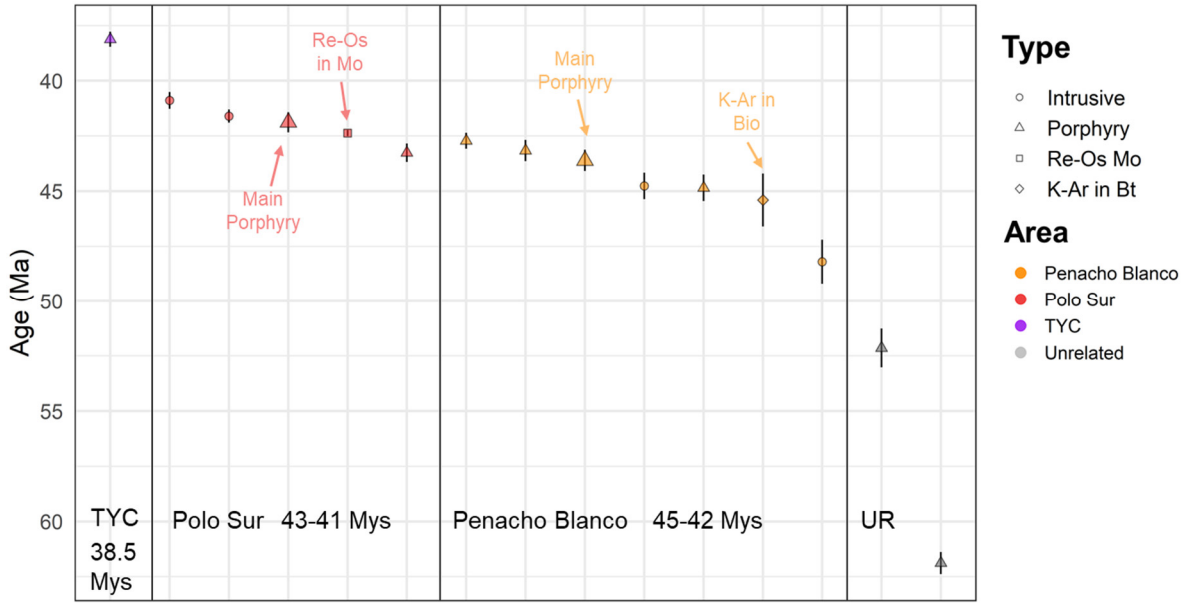

Figure 3.8: Ages obtained for this study. The oldest samples from Penacho Blanco was excluded from the age range because of its high uncertainty. Published Re-Os data in molybdenite (square symbol) and K-Ar in biotite (diamond) from Perelló et al. (2010) are plotted for comparison. Main porphyritic events are shown with bigger symbols.

The similarity between major elements, trace element, zircon geochemistry and isotopic data for samples from the different deposits suggests that they evolved from a similar source. The range of ages obtained suggests that the length of the magmatic activity was nearly 3 and 2 Myr for Penacho Blanco and Polo Sur, respectively. The magmatism was continuous in the area for almost 4 Ma and contemporaneous between 43 to 42 Ma in both areas.

Protracted magmatic activity has been observed in other porphyritic systems, such as Chuquicamata, Escondida, Quellaveco District and El Teniente (Ballard et al., 2001; Campbell et al., 2006; Sillitoe and Mortensen, 2010; Stern et al., 2011; Hao et al., 2019). This longevity does not fit with thermal modelling and cooling estimates that suggest mid to upper crustal magma chambers solidify in 10^5–10^6 years (Cawthorn and Walraven, 1998; Glazner et al., 2004; Coleman et al., 2004; Dosseto et al., 2011; de Saint Blanquat et al., 2011; Fiannacca et al., 2017; Schöpa et al., 2017), which suggest that the magmatic bodies that gave rise to the porphyries in the southern part of the Centinela District were build up incrementally in magma batches sourced from deeper reservoirs with flux focused through trans-lithospheric structures (Richards, 2003; Annen et al., 2006; de Saint Blanquat et al., 2011; Fiannacca et al., 2017).

3.5.2 The adakitic-like character of the magma.

The analysed porphyries have Sr/Y and La/Yb ratios that increase as the samples become more felsic. Rocks with these geochemical characteristics have been described as adakites, which were interpreted to be produced by the melting subducting oceanic slab in the Adak Islands (Defant and Drummond, 1990). Arc-related rocks, with similar geochemical characteristics, are commonly found associated with porphyry copper deposit. However, they are not produced by slab melting. Here, they will be referred as having an adakite-like signature, according to the definition of Richards and Kerrich, (2007), who define them as having Sr > 400, Y < 18 ppm, Sr/Y > 20 and La/Yb > 20.

The adakite-like signature in arcs have been attributed to their high water content (>4 wt.%), which suppress plagioclase crystallization in the early stages of magmatic evolution and promotes fractional crystallization dominated by amphibole ± titanite ± zircon ± garnet in a mid- to lower-crustal magma chamber (>20km, Richards and Kerrich, 2007; Richards, 2011; Chiaradia, 2015). The samples from the deposits show a sub-adakitic to adakite-like signature where samples from TYC have the highest Sr/Y and La/Yb ratios. In contrast, three samples from the group that is "unrelated to ore" follow the normal andesite-dacite-rhyolite series trend (Figure 3.9).

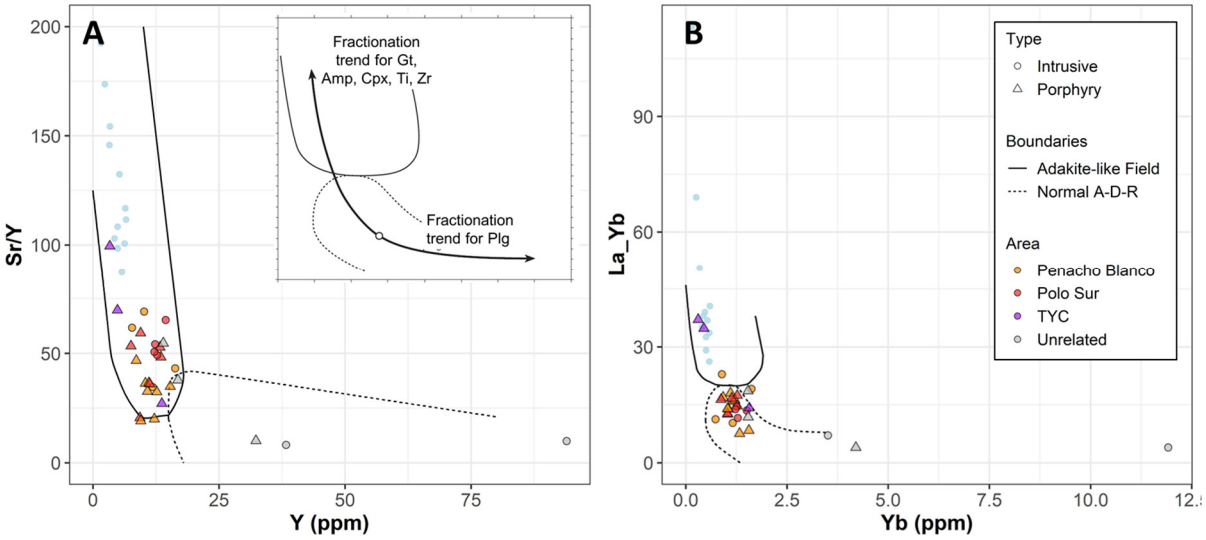

Figure 3.9: A) Sr/Y vs Y discrimination diagram for adakite-like rocks after Richards and Kerrich (2007). B) La/Yb vs Yb discrimination diagram for adakite-like rocks after Richards and Kerrich (2007). A-D-R: normal andesite-dacite-rhyolite series. Light Blue dots indicate data from Los Pelambres giant porphyry copper deposit (Reich et al., 2003).

The hydrous character of the adakitic signature suggests by the rare earth elements (REE) geochemistry. Porphyry associated intrusions have been described as having listric-shaped chondrite-normalized REE pattern produced by the fractionation of amphibole, for which the partition coefficients are MREE > HREE >LREE. Small to absent europium anomalies have

been attributed to late fractionation of plagioclase or to the oxidised character of these magmas (Richards and Kerrich, 2007). Although these may be contributing factors they cannot explain why Eu anomalies decrease with fractional crystallization and in some cases become positive. This observation is better explained by the fractionation of amphibole, which has a negative Eu anomaly, the effect of which balances or exceeds the influence of the positive anomaly in plagioclase.

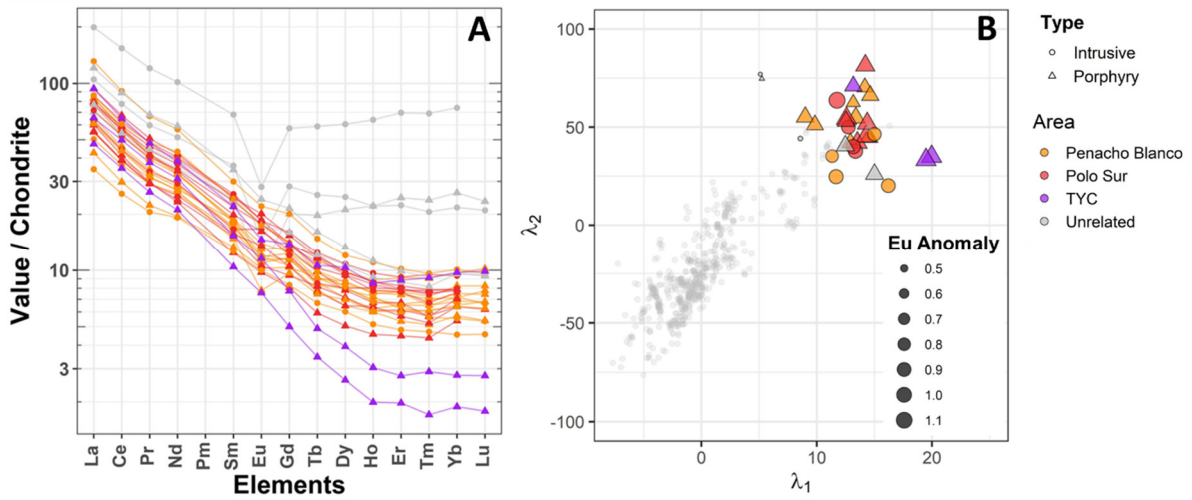

Figure 3.10: A) REE patterns for the analysed samples. B) λ_2 vs λ_1 diagram after O'Neill (2016) that allow cleaner visualisation and interpretation of REE pattern. Gray shadowed dots are the ocean floor basaltic glasses data from Jenner and O'Neill (2012).

Figure 3.10A shows REE patterns for samples from Centinela district whereas Figure 3.10B shows the same data expressed as the polynomial coefficients λ2 (curvature of the pattern) and λ1 (slope), following the work of O'Neill (2016). Each point represents a single REE pattern. All the samples associated with the deposits have similar listric-shaped pattern (Figure 3.10A) with little or no Eu anomaly, which is consistent with their classification as adakitic-like. The ore-associated samples are characterised by high λ2 and high λ1, indicating high curvature (listric shape) and high La/Lu (Figure 3.10B). Two samples from TYC area, which are characterised by substantial depletion of HREE, are exceptions. This depletion could be due to extensive amphibole fractionation or to residual garnet in the magma source if melting took place in thickened continental crust (>40-50 km, Richards and Kerrich, 2007; Chiaradia, 2015). Two of the three analysed TYC porphyries have very low HREE relative to the other samples analysed for this study. The combination of low HREE, and the listric shape of the patterns, imply amphibole fractionation (Richards and Kerrich, 2007). If it is assumed that the TYC magma crystallized 20 wt% of amphibole during its final stages of evolution, and assuming a partition coefficient of 10.6

for Yb in amphibole (Setiabudi, 2001), 77% Rayleigh fractional crystallization is required to cause the observed drop in HREE between the TYC porphyries with the highest and lowest HREE concentrations. This figure increases to 94% if the percentage of amphibole fractionation falls to 15%. Although these figures are indicative only they do show that the low HREE TYC porphyries are the product of extreme fractional crystallization.

3.5.3 The oxidation state of the magma

Sulphur can dissolve as S^{2-} or S^{6+} in the melt and the relative abundance of one state over the other is controlled by the oxygen fugacity of the magma (Figure 3.11A; Jugo et al., 2010; Richards, 2015). The importance of sulphur speciation lies on its impact on sulphur solubility: the solubility of S^{6+} is about ten times higher than S^{2-} (Jugo et al., 2010). Furthermore, maintaining sulphur as S^{6+} allows chalcophile elements to remain incompatible in the melt until volatile saturation is reached when they can be transferred into the ore-forming fluid (Figure 3.11B; Jugo et al., 2010; Yang, 2012).

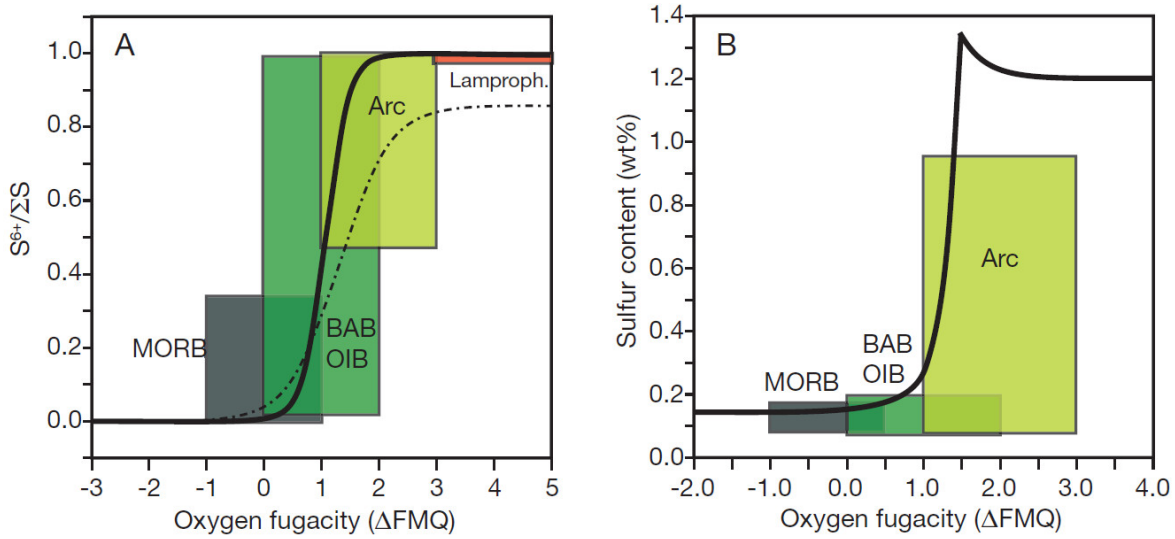

Figure 3.11: Modified after Audétat and Simon (2012), and Jugo et al. (2010). A) Sulphur speciation in mafic melts determined experimentally at 0.2 GPa, 1050 C, continuous line (Jugo et al., 2010) and measured by electron probe, dash-dotted line (Jugo et al., 2005). The areas indicate ranges from different tectonic settings measured in melt inclusions and mafic magmas. B) Sulphur saturation for mafic silicate melts (Jugo et al., 2010) and sulphur concentrations measured in primitive melt inclusions from different tectonic settings. Arc = subduction zone basalts, BAB = back-arc basin basalts, MORB = mid-ocean ridge basalts, OIB = oceanic island basalts.

The oxygen fugacity of the porphyries from the Centinela district was estimated using the Ce- in-zircon oxybarometer of Smythe and Brenan (2016). This method uses the Ce^{4+}/Ce^{3+} ratios

of the melt obtained from zircon (Ballard et al., 2002) in combination with whole-rock REE geochemistry. An important drawback of this method is that it requires knowledge of the water content of the magma, which is unknown for the analysed samples. The magmas that give rise to porphyry copper deposit typically have more than 4 wt.% of water (Richards, 2011; Richards, 2018) which allows the estimation of the oxygen fugacity if any increase in the water content of the melt with fractionation is ignored.

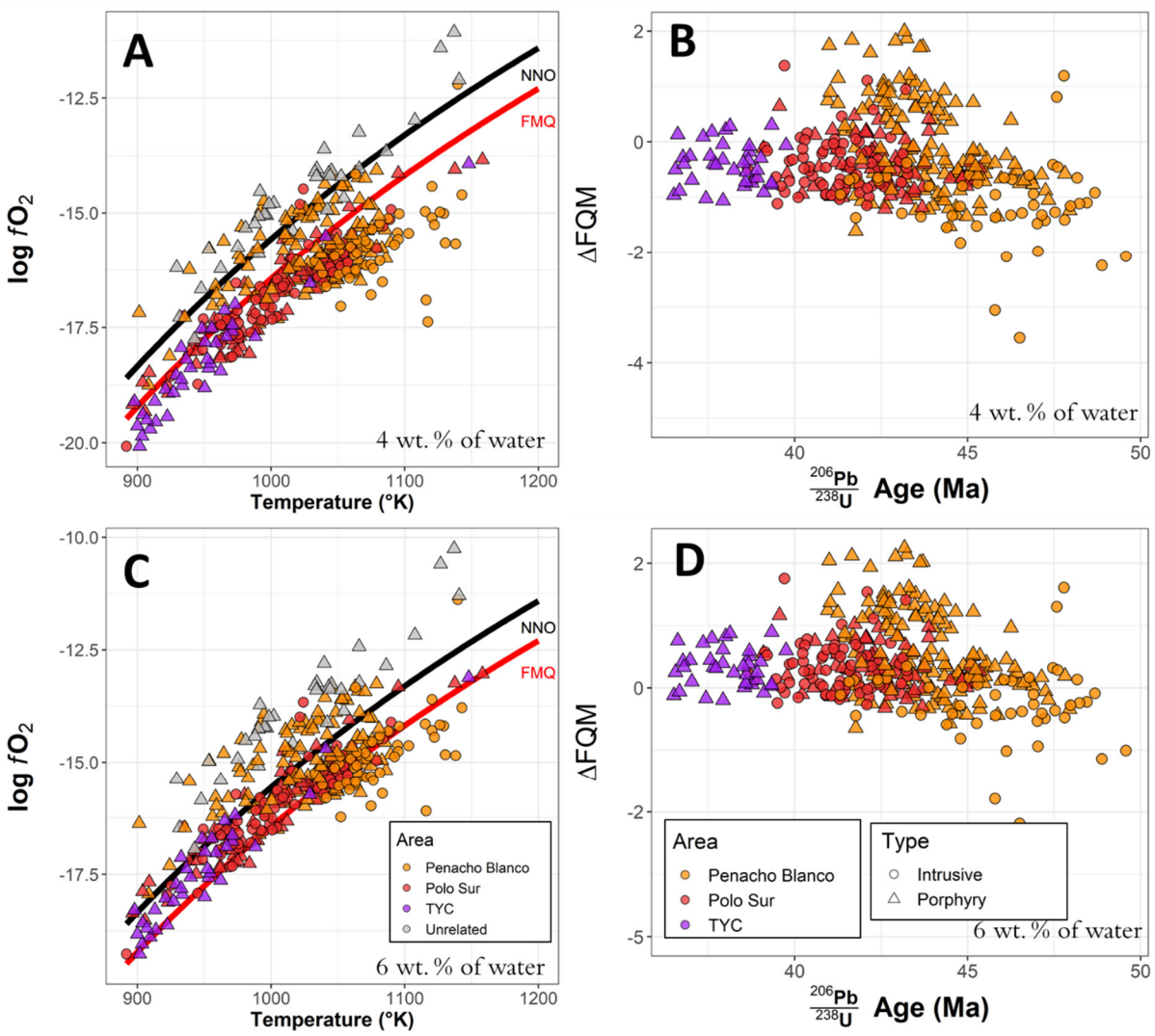

Figure 3.12: Oxygen fugacities estimated using the method of Smythe and Brenan (2016) assuming water contents of 4 an 6 wt.%. FMQ and NNO buffer were taken from O'Neill (1987) and Huebner and Sato (1970), respectively. A) fO_2 vs temperature assuming 4 wt.% H_2O. B) ΔFMQ vs $^{206}Pb/^{238}U$ age assuming 4 wt.% H_2O. The unrelated group was excluded. C) fO_2 vs temperature assuming 6 wt.% H_2O D) ΔFMQ vs $^{206}Pb/^{238}U$ age assuming 6 wt.% H_2O. Unrelated group was excluded.

Figure 3.12 shows the oxygen fugacity obtained for zircons from the deposits modelled for water contents of 4 and 6 wt. %. The calculated fO_2 values do not consider variation in the

water content of the melt with fractionation. A change from 4 to 6 wt. % H_2O raises the calculated fO_2 nearly 1 unit relative to the FQM buffer. In general, the estimated oxygen fugacity of the magma in relation to the FQM buffer increases steadily as zircon temperature fall and age of the samples becomes younger. This conclusion is supported by the increase in the Ce^{4+}/Ce^{3+} ratios and the Eu anomaly in zircons as their age decreases (Figure 2.17 and Figure 2.18), and Eu anomalies in the REE patterns that become progressively lower with fractionation from Penacho Blanco to Polo Sur deposit (Figure 2.13). An exception is the youngest sample from Penacho Blanco (353358), which gives an $fO2$ that is nearly one FQM unit higher than the general trend (Figure 3.12).

Estimates of the oxygen fugacity of arc magmas typically vary from nearly +1 to +3 units above the FMQ buffer (Carmichael, 1991; Parkinson and Arculus, 1999; Evans, 2012; Sun et al., 2015; Richards, 2015; Hattori, 2018, Figure 3.11A). Platinum group element data suggest that the Penacho Blanco magma became sulphide saturated before its MgO content had fallen to 3.7 wt.%. Nevertheless, it formed a Cu-dominated porphyry deposit, which indicates that a significant mass of the metals and sulphur were able to enter the fluid phase when the magma eventually became volatile saturated.

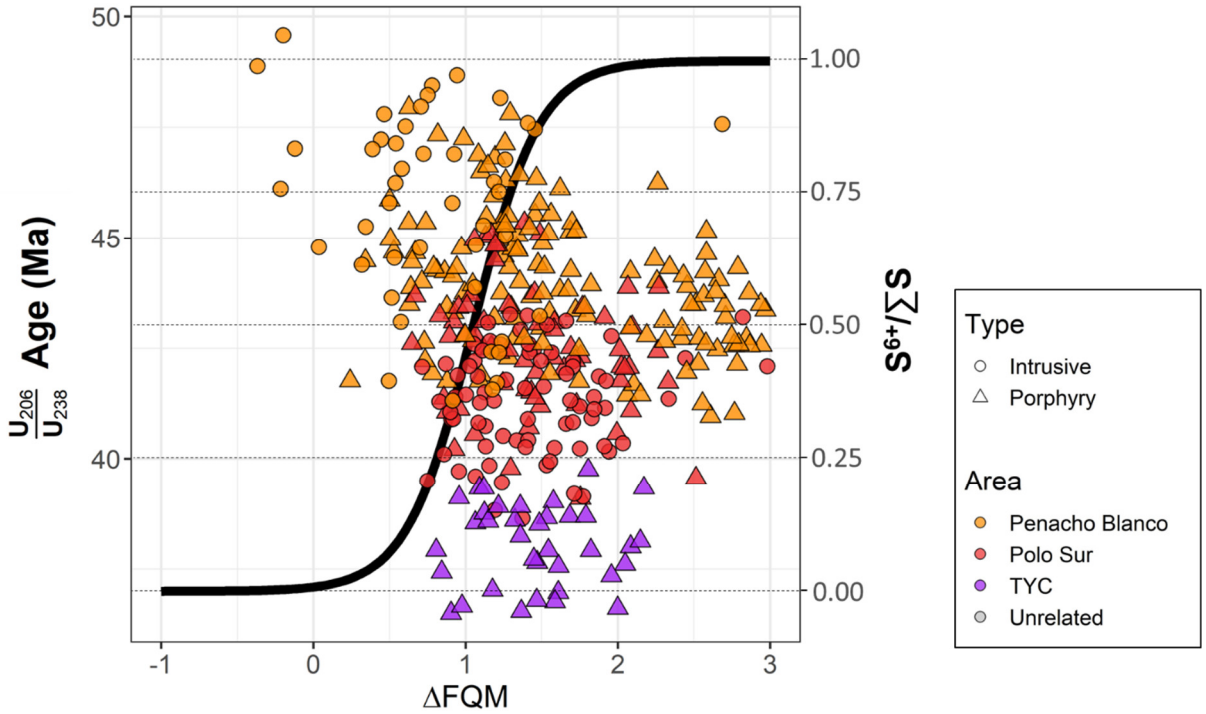

Figure 3.13: Oxygen fugacity at 9wt.% H_2O for analysed zircons vs $^{206}Pb/^{238}U$ age. Right scale indicates sulphur speciation between sulphide and sulphate at 0.2 GPa and 1050 °C (Jugo, 2010). The dashed lines represent the grid for the right axis.

The inference, based on Pd and Pt geochemistry, that the Penacho Blanco magma was continuously precipitating an immiscible sulphide melt once its MgO had fallen below 3.7 wt% is best explained by the fO_2 of the magma lying within a quarter of a log unit of FQM +1. This allows both S^{2-} or S^{6+} to be present in the melt in significant amounts. As the magma cools magnetite precipitates, which lowers the fO_2 of the melt and converts high solubility S^{6+} to low solubility S^{2-} leading to sulphide precipitation (Jenner et al., 2010). If this fO_2 is correct it can be inserted into the Ce-in-zircon oxybarometer of Smythe and Brenan (2016) to estimate the water content of the Penacho Blanco. The value obtained is a surprisingly high 9 wt.%, which is in agreement with the model of Chiaradia and Caricchi (2017) that suggest a 5.5 to 13 wt.% water content as optimal for the formation of porphyry copper deposits.

The apparent increase in Pd with decrease in MgO (Figure 3.3B) at Polo Sur might be due to destabilization of pre-existing sulphides in the source magma reservoir (Sun et al., 2013; Sun et al., 2015) degassing of the magma(Halter et al., 2005; Simon and Ripley, 2011; Audétat and Simon, 2012; Matjuschkin et al., 2016), a mafic injection in the magma chamber replenishing chalcophile metals in the source magma (Wallace and Edmonds, 2011; Dale et al., 2012; Hao et al., 2019), or presence of PGE-bearing hydrothermal minerals (Economou-Eliopoulos and Eliopoulos, 2000; Crespo et al., 2018). A Mafic recharge is the most likely explanation because the samples that give youngest dates at Polo Sur are diorites (353368 and 353369), which are less fractionated than the older dacitic porphyries. Another plausible option is the presence of hydrothermal PGE nuggets, that would explain the scattering observed when PGE are compared with MgO contents. However, the narrow compositional range of Polo Sur data makes difficult the interpretation of the results and further study might be needed (e.g. PGE content of hydrothermal sulphides).

The timescale over which the oxygen fugacity changed, almost 7 Ma, suggests that the variations are likely to be inherited from a deeper reservoir rather than at the level of porphyry emplacement. The increase in oxygen fugacity may be triggered by changes in the tectonic regime, that in the case of Centinela District coincides with the Incaic compressive event and change from trans-tensive to transpressive tectonism with crustal shortening and thickening, cease of volcanism (Noble et al., 1979; Haschke et al., 2002; Sillitoe and Perelló, 2005; Mpodozis and Cornejo, 2012) and focusing of slab derived fluid into the mantle wedge and the slab-arc plumbing system (Evans and Tomkins, 2011).

Chapter 4: Summary and conclusions

The porphyries from the Centinela district have an adakitic-like signature and show typical arc magma geochemical characteristics. They are enriched in large ion lithophile elements and depleted in high field strength elements, including Nb and Ta, when compared to the primitive mantle. Although the rocks have undergone variable potassic and phyllic hydrothermal alteration, by working with the least altered samples, it has been possible to decipher their original geochemistry.

The Penacho Blanco and Polo Sur suites were emplaced before ca. 45-42 and 43-41 Mys, respectively, with the youngest porphyries from the TYC area emplaced at ca. 38.5 Ma. The ages obtained from U-Pb zircon dating, and whole-rock and mineral chemistry, are consistent with them evolving from the same or similar sources. The mid to upper crustal magma chambers, which preceded the southern Centinela district porphyries, were emplaced over ca. 4 Myr, between 45 and 41 Ma. The longevity of this system was supported by the injection of several new magma batches that were incrementally added from a deeper reservoir. The hydrous character of the magma favoured the fractionation of amphibole over plagioclase, which resulted in the absence of Eu anomalies and depletion of the HREE, both of which are characteristic of porphyry Cu systems. Zircon geochemistry indicates that there is a continuous cooling as the intrusions become younger and the magmas became slightly more oxidised, creating a more favourable environment for chalcophile element accumulation. Eventually, the porphyries were emplaced in upper crustal levels where they exsolved their fluids and formed copper deposits.

Zircon and PGE geochemistry fertility indicators become more positive as the porphyries in the southern Centinela district become younger: whole-rock Pd/Pt, and Ce/Ce* and Eu/Eu* in zircons increase; and whole-rock Y and molar P in zircon decrease. Fertility indicators suggest that the TYC porphyry is the most prospective in the district but its depth (>1000 m) makes it uneconomic. The Esperanza porphyry (12 Mt of copper, 42-40 Mys) is the largest mined deposit in the Centinela district. It occupies the time gap between Polo Sur and TYC porphyries and I predict its fertility indicators will prove to be intermediate between these deposits.

Because the analysed samples cover a limited compositional range it was not possible to identify the onset of sulphide saturation in the Penacho Blanco or Polo Sur suites. All that can be said is that sulphide saturation occurred before the MgO concentration in the Penacho Blanco magma fell below 3.7 wt.%. Nevertheless, the Penacho Blanco and Polo Sur fall within the Cu only field on the Pd/MgO v Pd/Pt fertility diagram suggesting that the amount of sulphide to precipitate was small, enough to remove the Au from the melt but not enough to remove the Cu.

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APPENDIX

Appendix A1: Zircon Data, Geochronology and geochemistry

This appendix contains the data from zircon geochemistry, geochronology and the calculated variables for each zircon (Temperatures, Ce^{4+}/Ce^{3+} ratios, and oxygen fugacity). Additionally, results for R33 standard are included.

All the analysed elements are in ppm, ages are in Ma and ratios are unitless.

- The column sector indicates if the analysis was done in the rim, core or in the middle part of the grain.
- The column observation includes information of the treatment of the grain:
    1) Main Population: Refers to those grains that were considered as autocryst.
    2) Pb loss: Refers to those grains that were considered to undergone lead loss.
    3) Titanite/apatite inclusions: Those zircons that due to its high contents of P > 2000 ppm, La > 1 ppm or Ti > 30 ppm were considered to contain apatite or titanite inclusions.
    4) Rejected: Time-integrated LA-ICPMS was too short to be representative after removing Ti, P and La peaks.

Table A1. 1: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Area of analysis	Observation	Area	Age $^{206}Pb/^{238}U$ ^{207}Pb corrected (Ma)		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{206}Pb/^{207}Pb$		$^{206}Pb/^{238}U$ ^{207}Pb corrected
353353	1	RIM	Lead Loss	PB	42.2	±3.4	0.051	±0.020	0.0068	±0.0005	0.069	±0.030	0.0066
353353	2	RIM	Lead Loss	PB	42.2	±2.8	0.054	±0.016	0.0067	±0.0004	0.062	±0.019	0.0066
353353	3	RIM	Lead Loss	PB	39.1	±1.7	0.062	±0.010	0.0063	±0.0003	0.076	±0.013	0.0061
353353	4	RIM	Lead Loss	PB	37.7	±4.0	0.103	±0.028	0.0069	±0.0006	0.163	±0.056	0.0059
353353	5	RIM	Lead Loss	PB	40.0	±1.8	0.038	±0.007	0.0062	±0.0003	0.045	±0.008	0.0062
353353	6	RIM	Main Population	PB	44.8	±3.2	0.061	±0.018	0.0072	±0.0005	0.067	±0.021	0.0070
353353	7	RIM	Main Population	PB	43.9	±1.9	0.053	±0.007	0.0069	±0.0003	0.057	±0.008	0.0068
353353	8	RIM	Main Population	PB	43.5	±2.2	0.043	±0.010	0.0068	±0.0004	0.046	±0.011	0.0068
353353	9	RIM	Main Population	PB	46.4	±4.0	0.063	±0.028	0.0073	±0.0006	0.057	±0.025	0.0072
353353	10	RIM	Discordant	PB	43.5	±1.9	0.036	±0.007	0.0068	±0.0003	0.039	±0.008	0.0068
353353	11	RIM	Main Population	PB	47.2	±3.4	0.054	±0.023	0.0075	±0.0005	0.059	±0.028	0.0074
353353	12	RIM	Main Population	PB	47.8	±3.5	0.055	±0.019	0.0075	±0.0005	0.057	±0.022	0.0074
353353	13	RIM	Main Population	PB	44.3	±3.0	0.039	±0.012	0.0069	±0.0005	0.044	±0.016	0.0069
353353	14	RIM	Main Population	PB	45.4	±2.9	0.040	±0.014	0.0071	±0.0005	0.046	±0.016	0.0071
353353	15	RIM	Lead Loss	PB	38.4	±3.8	0.056	±0.022	0.0062	±0.0006	0.071	±0.027	0.0060
353353	16	RIM	Main Population	PB	45.1	±2.2	0.052	±0.009	0.0071	±0.0003	0.055	±0.010	0.0070
353353	17	RIM	Lead Loss	PB	41.7	±4.0	0.042	±0.021	0.0065	±0.0006	0.050	±0.026	0.0065
353353	18	RIM	Main Population	PB	44.0	±2.3	0.044	±0.011	0.0069	±0.0004	0.046	±0.012	0.0069
353353	19	RIM	Discordant	PB	47.7	±3.3	0.112	±0.026	0.0080	±0.0005	0.103	±0.025	0.0074
353353	20	RIM	Main Population	PB	44.4	±2.8	0.048	±0.012	0.0069	±0.0004	0.049	±0.012	0.0069
353353	21	RIM	Main Population	PB	47.3	±3.1	0.043	±0.014	0.0074	±0.0005	0.041	±0.015	0.0074
353353	22	RIM	Main Population	PB	43.9	±3.6	0.052	±0.021	0.0069	±0.0006	0.055	±0.024	0.0068
353353	23	RIM	Lead Loss	PB	41.7	±3.4	0.070	±0.021	0.0068	±0.0005	0.079	±0.026	0.0065
353353	24	RIM	Main Population	PB	46.3	±3.9	0.048	±0.023	0.0073	±0.0006	0.059	±0.028	0.0072
353353	25	RIM	Main Population	PB	43.7	±3.4	0.039	±0.015	0.0069	±0.0005	0.053	±0.021	0.0068
353353	26	RIM	Lead Loss	PB	39.8	±2.1	0.052	±0.013	0.0063	±0.0003	0.066	±0.018	0.0062

Table A1. 1 continued: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.Table A1. 1: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Area of analysis	Observation	Area	Age $^{206}Pb/^{238}U$ ^{207}Pb corrected (Ma)		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{206}Pb/^{207}Pb$		$^{206}Pb/^{238}U$ ^{207}Pb corrected
353353	27	RIM	Main Population	PB	44.5	±3.2	0.052	±0.014	0.0070	±0.0005	0.056	±0.015	0.0069
353353	28	RIM	Lead Loss	PB	39.5	±3.2	0.054	±0.018	0.0062	±0.0005	0.059	±0.021	0.0061
353353	29	RIM	Discordant	PB	44.8	±3.3	0.031	±0.014	0.0070	±0.0005	0.036	±0.019	0.0070
353353	30	RIM	Lead Loss	PB	41.1	±2.1	0.060	±0.012	0.0066	±0.0003	0.070	±0.014	0.0064
353353	31	RIM	Main Population	PB	44.6	±3.5	0.044	±0.023	0.0070	±0.0006	0.049	±0.026	0.0069
353353	32	RIM	Lead Loss	PB	40.6	±2.2	0.046	±0.013	0.0064	±0.0003	0.059	±0.017	0.0063
353353	33	RIM	Main Population	PB	44.5	±2.9	0.052	±0.021	0.0071	±0.0005	0.061	±0.035	0.0069
353353	34	RIM	Main Population	PB	46.8	±3.4	0.043	±0.015	0.0073	±0.0005	0.047	±0.018	0.0073
353353	35	RIM	Discordant	PB	43.8	±3.1	0.033	±0.014	0.0068	±0.0005	0.030	±0.015	0.0068
353353	36	RIM	Lead Loss	PB	39.0	±3.0	0.064	±0.017	0.0064	±0.0005	0.081	±0.024	0.0061
353353	37	RIM	Inherited	PB	57.1	±2.7	0.060	±0.010	0.0089	±0.0004	0.050	±0.008	0.0089
353353	38	RIM	Lead Loss	PB	41.8	±1.9	0.036	±0.008	0.0065	±0.0003	0.041	±0.009	0.0065
353353	39	RIM	Main Population	PB	46.4	±2.6	0.044	±0.010	0.0072	±0.0004	0.046	±0.011	0.0072
353353	40	RIM	Lead Loss	PB	42.5	±2.3	0.045	±0.012	0.0067	±0.0004	0.052	±0.014	0.0066
353353	41	RIM	Discordant	PB	45.5	±2.9	0.073	±0.016	0.0073	±0.0005	0.070	±0.015	0.0071
353353	42	RIM	Main Population	PB	43.2	±2.5	0.039	±0.010	0.0067	±0.0004	0.046	±0.012	0.0067
353353	43	RIM	Main Population	PB	47.9	±5.3	0.063	±0.022	0.0076	±0.0008	0.062	±0.022	0.0075
353353	44	RIM	Titanite/Apatite Inclusions	PB	47.2	±5.5	0.117	±0.045	0.0080	±0.0009	0.108	±0.036	0.0074
353353	45	RIM	Discordant	PB	44.2	±2.2	0.058	±0.009	0.0070	±0.0003	0.061	±0.010	0.0069
353353	46	RIM	Discordant	PB	44.3	±3.4	0.022	±0.014	0.0069	±0.0005	0.025	±0.017	0.0069
353353	47	RIM	Main Population	PB	45.3	±5.6	0.030	±0.030	0.0071	±0.0009	0.040	±0.039	0.0071
353353	48	RIM	Main Population	PB	43.8	±3.1	0.041	±0.015	0.0068	±0.0005	0.038	±0.014	0.0068
353353	49	RIM	Main Population	PB	44.9	±3.1	0.056	±0.014	0.0070	±0.0005	0.053	±0.014	0.0070
353355	1	RIM	Main Population	PB	43.4	±2.6	0.041	±0.010	0.0068	±0.0004	0.046	±0.013	0.0068
353355	2	RIM	Main Population	PB	44.5	±3.4	0.036	±0.014	0.0069	±0.0005	0.042	±0.017	0.0069
353355	3	RIM	Main Population	PB	41.8	±3.0	0.040	±0.011	0.0065	±0.0005	0.044	±0.013	0.0065

Table A1. 1 continued: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.Table A1. 1: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Area of analysis	Observation	Area	Age $^{206}Pb/^{238}U$ ^{207}Pb corrected (Ma)		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{206}Pb/^{207}Pb$		$^{206}Pb/^{238}U$ ^{207}Pb corrected
353355	4	RIM	Lead Loss	PB	41.7	±2.7	0.037	±0.011	0.0065	±0.0004	0.043	±0.014	0.0065
353355	5	RIM	Discordant	PB	45.4	±3.7	0.034	±0.014	0.0071	±0.0006	0.036	±0.016	0.0071
353355	6	RIM	Discordant	PB	44.3	±3.2	0.035	±0.011	0.0069	±0.0005	0.037	±0.012	0.0069
353355	7	RIM	Main Population	PB	44.8	±3.2	0.038	±0.016	0.0070	±0.0005	0.039	±0.017	0.0070
353355	8	RIM	Main Population	PB	43.4	±6.0	0.046	±0.020	0.0069	±0.0009	0.065	±0.028	0.0068
353355	9	RIM	Inherited	PB	47.8	±3.4	0.046	±0.014	0.0074	±0.0005	0.044	±0.015	0.0074
353355	10	RIM	Main Population	PB	45.9	±3.4	0.058	±0.017	0.0073	±0.0005	0.061	±0.018	0.0071
353355	10	CORE	Main Population	PB	43.2	±2.4	0.043	±0.008	0.0067	±0.0004	0.047	±0.008	0.0067
353355	11	RIM	Main Population	PB	41.9	±3.1	0.037	±0.012	0.0065	±0.0005	0.041	±0.013	0.0065
353355	12	RIM	Main Population	PB	44.7	±3.5	0.047	±0.020	0.0070	±0.0006	0.053	±0.023	0.0070
353355	13	RIM	Main Population	PB	43.3	±4.0	0.052	±0.020	0.0068	±0.0006	0.056	±0.026	0.0067
353355	14	CORE	Main Population	PB	42.8	±3.8	0.053	±0.025	0.0068	±0.0006	0.065	±0.034	0.0067
353355	14	MID	Main Population	PB	42.6	±3.6	0.046	±0.017	0.0067	±0.0006	0.052	±0.022	0.0066
353355	14	MID	Lead Loss	PB	40.1	±3.6	0.035	±0.015	0.0063	±0.0006	0.054	±0.023	0.0062
353355	14	RIM	Discordant	PB	46.9	±3.6	0.039	±0.014	0.0073	±0.0006	0.037	±0.014	0.0073
353355	15	RIM	Main Population	PB	42.7	±2.9	0.047	±0.010	0.0067	±0.0005	0.054	±0.012	0.0066
353355	16	RIM	Main Population	PB	45.1	±3.0	0.057	±0.015	0.0072	±0.0005	0.063	±0.016	0.0070
353355	17	RIM	Main Population	PB	44.7	±3.7	0.045	±0.017	0.0070	±0.0006	0.050	±0.020	0.0070
353355	18	RIM	Main Population	PB	44.2	±3.2	0.048	±0.012	0.0069	±0.0005	0.052	±0.014	0.0069
353355	19	RIM	Lead Loss	PB	41.6	±3.3	0.038	±0.015	0.0065	±0.0005	0.047	±0.019	0.0065
353355	20	RIM	Main Population	PB	41.8	±3.5	0.045	±0.014	0.0065	±0.0006	0.052	±0.018	0.0065
353355	21	CORE	Inherited	PB	424.9	±15.0	0.510	±0.035	0.0681	±0.0025	0.054	±0.004	0.0681
353355	21	RIM	Inherited	PB	418.1	±15.0	0.501	±0.038	0.0670	±0.0025	0.054	±0.004	0.0670
353355	22	RIM	Main Population	PB	45.0	±3.1	0.040	±0.013	0.0070	±0.0005	0.048	±0.017	0.0070
353355	23	RIM	Inherited	PB	47.8	±4.0	0.051	±0.017	0.0075	±0.0006	0.050	±0.017	0.0074
353355	24	RIM	Main Population	PB	43.0	±2.4	0.047	±0.012	0.0067	±0.0004	0.052	±0.013	0.0067

Table A1. 1 continued: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.Table A1. 1: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Area of analysis	Observation	Area	Age $^{206}Pb/^{238}U$ ^{207}Pb corrected (Ma)		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{206}Pb/^{207}Pb$		$^{206}Pb/^{238}U$ ^{207}Pb corrected
353355	25	RIM	Main Population	PB	42.7	±3.3	0.050	±0.017	0.0067	±0.0005	0.049	±0.019	0.0066
353355	26	RIM	Inherited	PB	51.2	±2.8	0.062	±0.011	0.0081	±0.0004	0.057	±0.010	0.0080
353355	27	RIM	Main Population	PB	41.8	±2.1	0.044	±0.007	0.0065	±0.0003	0.051	±0.008	0.0065
353355	28	RIM	Main Population	PB	41.9	±3.0	0.053	±0.015	0.0066	±0.0005	0.051	±0.016	0.0065
353355	29	RIM	Main Population	PB	43.2	±3.1	0.051	±0.015	0.0068	±0.0005	0.056	±0.017	0.0067
353355	30	RIM	Main Population	PB	45.0	±3.0	0.042	±0.012	0.0070	±0.0005	0.048	±0.014	0.0070
353355	31	RIM	Discordant	PB	47.1	±5.2	0.067	±0.019	0.0075	±0.0008	0.065	±0.018	0.0073
353355	32	RIM	Main Population	PB	42.3	±4.0	0.057	±0.023	0.0068	±0.0006	0.069	±0.030	0.0066
353355	33	RIM	Inherited	PB	61.9	±3.5	0.057	±0.011	0.0097	±0.0006	0.045	±0.009	0.0097
353355	34	RIM	Main Population	PB	41.8	±1.9	0.046	±0.008	0.0065	±0.0003	0.048	±0.008	0.0065
353355	35	RIM	Main Population	PB	45.3	±2.8	0.046	±0.012	0.0071	±0.0004	0.047	±0.013	0.0071
353355	36	CORE	Main Population	PB	45.0	±3.5	0.050	±0.018	0.0071	±0.0005	0.057	±0.021	0.0070
353355	36	RIM	Main Population	PB	45.5	±2.2	0.049	±0.007	0.0071	±0.0004	0.050	±0.007	0.0071
353355	37	RIM	Discordant	PB	42.2	±3.4	0.067	±0.027	0.0069	±0.0005	0.079	±0.033	0.0066
353355	38	RIM	Main Population	PB	42.5	±2.9	0.050	±0.012	0.0067	±0.0005	0.059	±0.015	0.0066
353355	39	RIM	Main Population	PB	44.3	±2.6	0.046	±0.012	0.0069	±0.0004	0.049	±0.013	0.0069
353355	40	RIM	Main Population	PB	43.9	±3.0	0.047	±0.014	0.0069	±0.0005	0.055	±0.017	0.0068
353355	41	RIM	Main Population	PB	44.1	±3.2	0.043	±0.014	0.0069	±0.0005	0.045	±0.016	0.0069
353355	42	RIM	Discordant	PB	45.5	±8.6	0.106	±0.049	0.0076	±0.0013	0.101	±0.042	0.0071
353355	43	RIM	Discordant	PB	46.5	±3.7	0.028	±0.012	0.0072	±0.0006	0.029	±0.015	0.0072
353355	44	CORE	Main Population	PB	43.2	±3.4	0.056	±0.016	0.0069	±0.0005	0.064	±0.019	0.0067
353355	44	RIM	Main Population	PB	43.8	±3.2	0.037	±0.016	0.0068	±0.0005	0.044	±0.019	0.0068
353355	45	RIM	Main Population	PB	44.7	±2.4	0.048	±0.010	0.0070	±0.0004	0.049	±0.011	0.0070
353355	46	RIM	Main Population	PB	44.0	±2.8	0.039	±0.012	0.0069	±0.0004	0.043	±0.014	0.0069
353355	47	RIM	Main Population	PB	46.0	±4.7	0.041	±0.019	0.0072	±0.0007	0.054	±0.027	0.0072
353355	48	RIM	Main Population	PB	46.6	±3.7	0.046	±0.016	0.0073	±0.0006	0.043	±0.014	0.0073

Table A1. 1 continued: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.Table A1. 1: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Area of analysis	Observation	Area	Age $^{206}Pb/^{238}U$ ^{207}Pb corrected (Ma)		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{206}Pb/^{207}Pb$		$^{206}Pb/^{238}U$ ^{207}Pb corrected
353355	49	RIM	Main Population	PB	44.3	±3.8	0.043	±0.016	0.0069	±0.0006	0.048	±0.017	0.0069
353355	50	RIM	Main Population	PB	43.3	±2.2	0.050	±0.009	0.0068	±0.0004	0.054	±0.010	0.0067
353358	1	RIM	Main Population	PB	43.2	±2.4	0.042	±0.013	0.0068	±0.0004	0.050	±0.016	0.0067
353358	2	RIM	Main Population	PB	43.4	±2.1	0.046	±0.010	0.0068	±0.0003	0.054	±0.012	0.0067
353358	3	RIM	Main Population	PB	44.0	±2.5	0.049	±0.012	0.0069	±0.0004	0.056	±0.013	0.0069
353358	4	RIM	Inherited	PB	44.8	±5.9	0.016	±0.020	0.0070	±0.0009	0.017	±0.022	0.0070
353358	5	RIM	Main Population	PB	43.2	±2.0	0.042	±0.007	0.0067	±0.0003	0.047	±0.007	0.0067
353358	6	RIM	Main Population	PB	43.8	±2.4	0.057	±0.016	0.0069	±0.0004	0.059	±0.017	0.0068
353358	7	RIM	Inherited	PB	61.9	±5.8	0.062	±0.027	0.0097	±0.0009	0.044	±0.019	0.0097
353358	8	RIM	Main Population	PB	43.6	±1.6	0.038	±0.006	0.0068	±0.0003	0.040	±0.006	0.0068
353358	9	RIM	Main Population	PB	41.7	±2.3	0.048	±0.013	0.0066	±0.0004	0.058	±0.016	0.0065
353358	10	RIM	Main Population	PB	42.6	±1.4	0.043	±0.006	0.0066	±0.0002	0.049	±0.007	0.0066
353358	11	RIM	Discordant	PB	43.4	±2.0	0.036	±0.007	0.0068	±0.0003	0.039	±0.007	0.0068
353358	13	RIM	Main Population	PB	43.2	±1.3	0.043	±0.005	0.0067	±0.0002	0.046	±0.005	0.0067
353358	14	RIM	Main Population	PB	42.7	±2.7	0.035	±0.012	0.0067	±0.0004	0.039	±0.014	0.0067
353358	15	RIM	Inherited	PB	45.4	±2.7	0.034	±0.012	0.0071	±0.0004	0.042	±0.015	0.0071
353358	16	RIM	Inherited	PB	46.4	±2.8	0.048	±0.012	0.0072	±0.0004	0.048	±0.013	0.0072
353358	17	RIM	Main Population	PB	43.5	±2.7	0.043	±0.012	0.0068	±0.0004	0.052	±0.016	0.0068
353358	18	RIM	Discordant	PB	43.5	±2.5	0.035	±0.010	0.0068	±0.0004	0.036	±0.010	0.0068
353358	19	RIM	Main Population	PB	43.7	±2.5	0.047	±0.011	0.0068	±0.0004	0.048	±0.012	0.0068
353358	20	RIM	Main Population	PB	41.3	±2.1	0.048	±0.008	0.0065	±0.0003	0.055	±0.009	0.0064
353358	21	RIM	Main Population	PB	42.2	±1.6	0.044	±0.007	0.0066	±0.0003	0.048	±0.008	0.0066
353358	22	RIM	Main Population	PB	44.3	±2.2	0.040	±0.010	0.0069	±0.0004	0.044	±0.010	0.0069
353358	23	RIM	Main Population	PB	43.7	±1.8	0.052	±0.007	0.0069	±0.0003	0.057	±0.008	0.0068
353358	24	RIM	Main Population	PB	41.4	±2.6	0.049	±0.013	0.0065	±0.0004	0.053	±0.015	0.0064
353358	25	RIM	Main Population	PB	43.9	±2.9	0.048	±0.014	0.0069	±0.0005	0.050	±0.017	0.0068

Table A1. 1 continued: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.Table A1. 1: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Area of analysis	Observation	Area	Age $^{206}Pb/^{238}U$ ^{207}Pb corrected (Ma)		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{206}Pb/^{207}Pb$		$^{206}Pb/^{238}U$ ^{207}Pb corrected
353358	26	RIM	Main Population	PB	41.7	±1.5	0.045	±0.006	0.0065	±0.0002	0.050	±0.006	0.0065
353358	27	RIM	Main Population	PB	42.7	±2.8	0.036	±0.012	0.0067	±0.0004	0.045	±0.014	0.0067
353358	28	RIM	Main Population	PB	42.7	±2.4	0.042	±0.012	0.0067	±0.0004	0.048	±0.014	0.0067
353358	29	RIM	Main Population	PB	41.0	±1.7	0.039	±0.008	0.0064	±0.0003	0.045	±0.009	0.0064
353358	30	RIM	Discordant	PB	42.5	±1.8	0.053	±0.008	0.0067	±0.0003	0.058	±0.009	0.0066
353358	31	RIM	Main Population	PB	41.0	±2.6	0.042	±0.016	0.0064	±0.0004	0.055	±0.021	0.0064
353358	32	RIM	Main Population	PB	43.3	±2.3	0.044	±0.013	0.0068	±0.0004	0.048	±0.014	0.0067
353358	33	RIM	Main Population	PB	43.0	±1.7	0.040	±0.007	0.0067	±0.0003	0.045	±0.007	0.0067
353358	34	RIM	Titanite/Apatite Inclusions	PB	42.4	±1.4	0.038	±0.005	0.0066	±0.0002	0.042	±0.005	0.0066
353358	35	RIM	Main Population	PB	42.2	±1.6	0.047	±0.007	0.0066	±0.0003	0.051	±0.007	0.0066
353358	36	CORE	Main Population	PB	43.1	±3.1	0.043	±0.015	0.0068	±0.0005	0.051	±0.019	0.0067
353358	36	MID	Main Population	PB	41.2	±2.7	0.055	±0.016	0.0066	±0.0004	0.065	±0.020	0.0064
353358	36	RIM	Inherited	PB	46.7	±2.3	0.039	±0.012	0.0073	±0.0004	0.043	±0.013	0.0073
353358	37	RIM	Main Population	PB	42.6	±2.6	0.049	±0.012	0.0067	±0.0004	0.054	±0.014	0.0066
353358	38	RIM	Main Population	PB	42.9	±1.9	0.040	±0.008	0.0067	±0.0003	0.043	±0.009	0.0067
353358	39	RIM	Inherited	PB	45.4	±2.9	0.030	±0.012	0.0071	±0.0005	0.036	±0.015	0.0071
353358	40	RIM	Inherited	PB	45.8	±2.5	0.067	±0.017	0.0073	±0.0004	0.064	±0.017	0.0071
353358	41	RIM	Main Population	PB	43.2	±1.8	0.038	±0.008	0.0067	±0.0003	0.040	±0.009	0.0067
353358	42	RIM	Main Population	PB	43.0	±1.7	0.044	±0.008	0.0067	±0.0003	0.050	±0.010	0.0067
353358	43	RIM	Main Population	PB	42.6	±2.3	0.047	±0.009	0.0067	±0.0004	0.054	±0.010	0.0066
353358	44	RIM	Main Population	PB	42.6	±2.2	0.050	±0.011	0.0067	±0.0003	0.057	±0.012	0.0066
353358	45	CORE	Main Population	PB	43.8	±3.2	0.040	±0.017	0.0068	±0.0005	0.046	±0.025	0.0068
353358	45	RIM	Discordant	PB	43.5	±2.8	0.030	±0.013	0.0068	±0.0004	0.035	±0.015	0.0068
353358	46	RIM	Lead Loss	PB	35.1	±4.1	0.147	±0.030	0.0064	±0.0006	0.158	±0.030	0.0055
353358	47	CORE	Lead Loss	PB	37.0	±5.5	0.454	±0.079	0.0095	±0.0009	0.359	±0.060	0.0058
353358	47	RIM	Inherited	PB	44.8	±3.0	0.037	±0.014	0.0070	±0.0005	0.041	±0.018	0.0070

Table A1. 1 continued: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.Table A1. 1: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Area of analysis	Observation	Area	Age $^{206}Pb/^{238}U$ ^{207}Pb corrected (Ma)		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{206}Pb/^{207}Pb$		$^{206}Pb/^{238}U$ ^{207}Pb corrected
353358	48	RIM	Main Population	PB	44.1	±3.0	0.051	±0.013	0.0069	±0.0005	0.053	±0.015	0.0069
353358	49	RIM	Main Population	PB	43.2	±1.8	0.041	±0.007	0.0067	±0.0003	0.046	±0.007	0.0067
353362	1	RIM	Inherited	PS	48.1	±3.0	0.049	±0.012	0.0075	±0.0005	0.048	±0.013	0.0075
353362	2	RIM	Main Population	PS	43.1	±4.1	0.049	±0.020	0.0068	±0.0006	0.053	±0.023	0.0067
353362	3	RIM	Main Population	PS	44.8	±2.0	0.043	±0.009	0.0070	±0.0003	0.042	±0.009	0.0070
353362	4	RIM	Rejected	PS	46.1	±4.1	0.074	±0.020	0.0074	±0.0006	0.073	±0.021	0.0072
353362	5	RIM	Main Population	PS	45.1	±1.5	0.041	±0.005	0.0070	±0.0002	0.044	±0.005	0.0070
353362	6	RIM	Main Population	PS	45.0	±1.9	0.043	±0.010	0.0070	±0.0003	0.044	±0.010	0.0070
353362	6	CORE	Lead Loss	PS	39.8	±3.5	0.053	±0.018	0.0063	±0.0006	0.065	±0.022	0.0062
353362	7	RIM	Inherited	PS	58.6	±4.1	0.076	±0.013	0.0092	±0.0006	0.057	±0.009	0.0091
353362	8	RIM	Main Population	PS	42.6	±2.8	0.043	±0.014	0.0067	±0.0004	0.049	±0.016	0.0066
353362	9	RIM	Main Population	PS	41.7	±1.2	0.044	±0.005	0.0065	±0.0002	0.048	±0.006	0.0065
353362	10	RIM	Main Population	PS	44.5	±2.5	0.051	±0.012	0.0070	±0.0004	0.053	±0.014	0.0069
353362	11	RIM	Inherited	PS	48.2	±2.4	0.047	±0.012	0.0075	±0.0004	0.047	±0.012	0.0075
353362	12	CORE	Inherited	PS	50.1	±2.0	0.047	±0.009	0.0078	±0.0003	0.043	±0.007	0.0078
353362	12	RIM	Inherited	PS	76.8	±6.2	0.073	±0.020	0.0120	±0.0010	0.049	±0.015	0.0120
353362	13	RIM	Inherited	PS	47.0	±3.2	0.049	±0.017	0.0073	±0.0005	0.046	±0.015	0.0073
353362	14	RIM	Inherited	PS	47.1	±1.8	0.042	±0.008	0.0073	±0.0003	0.044	±0.009	0.0073
353362	15	RIM	Main Population	PS	41.6	±3.6	0.046	±0.019	0.0065	±0.0006	0.047	±0.021	0.0065
353362	16	RIM	Main Population	PS	42.8	±2.4	0.037	±0.012	0.0067	±0.0004	0.032	±0.012	0.0067
353362	17	RIM	Main Population	PS	42.4	±2.8	0.043	±0.012	0.0066	±0.0004	0.048	±0.014	0.0066
353362	18	RIM	Main Population	PS	41.7	±4.7	0.044	±0.018	0.0065	±0.0007	0.053	±0.027	0.0065
353362	19	RIM	Main Population	PS	44.8	±2.5	0.038	±0.011	0.0070	±0.0004	0.040	±0.012	0.0070
353362	20	CORE	Inherited	PS	48.4	±3.3	0.039	±0.013	0.0075	±0.0005	0.042	±0.013	0.0075
353362	20	RIM	Main Population	PS	45.0	±2.6	0.039	±0.011	0.0070	±0.0004	0.041	±0.012	0.0070
353362	21	RIM	Main Population	PS	41.4	±4.5	0.033	±0.012	0.0064	±0.0007	0.047	±0.019	0.0064

Table A1. 1 continued: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.Table A1. 1: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Area of analysis	Observation	Area	Age $^{206}Pb/^{238}U$ ^{207}Pb corrected (Ma)		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{206}Pb/^{207}Pb$		$^{206}Pb/^{238}U$ ^{207}Pb corrected
353362	22	CORE	Main Population	PS	45.0	±2.4	0.051	±0.015	0.0071	±0.0004	0.053	±0.015	0.0070
353362	22	RIM	Lead Loss	PS	40.3	±3.0	0.051	±0.015	0.0064	±0.0005	0.064	±0.020	0.0063
353362	23	CORE	Main Population	PS	44.8	±3.2	0.049	±0.014	0.0070	±0.0005	0.054	±0.016	0.0070
353362	23	RIM	Main Population	PS	41.2	±2.4	0.040	±0.008	0.0064	±0.0004	0.051	±0.010	0.0064
353362	24	RIM	Main Population	PS	43.9	±1.1	0.047	±0.003	0.0069	±0.0002	0.049	±0.003	0.0068
353362	25	RIM	Main Population	PS	45.1	±2.4	0.044	±0.010	0.0070	±0.0004	0.045	±0.011	0.0070
353362	26	RIM	Main Population	PS	42.8	±3.0	0.046	±0.013	0.0067	±0.0005	0.054	±0.016	0.0067
353362	27	RIM	Main Population	PS	42.5	±1.8	0.052	±0.010	0.0067	±0.0003	0.056	±0.011	0.0066
353362	28	RIM	Main Population	PS	45.3	±2.9	0.045	±0.014	0.0071	±0.0005	0.047	±0.014	0.0071
353362	29	RIM	Lead Loss	PS	36.6	±1.4	0.041	±0.006	0.0057	±0.0002	0.051	±0.008	0.0057
353362	30	RIM	Inherited	PS	46.0	±5.4	0.025	±0.014	0.0072	±0.0008	0.026	±0.015	0.0072
353362	31	RIM	Lead Loss	PS	39.6	±2.4	0.037	±0.010	0.0062	±0.0004	0.042	±0.011	0.0062
353362	32	RIM	Discordant	PS	43.1	±3.4	0.032	±0.017	0.0067	±0.0005	0.037	±0.021	0.0067
353362	33	RIM	Lead Loss	PS	38.4	±2.2	0.036	±0.010	0.0060	±0.0003	0.041	±0.012	0.0060
353362	34	RIM	Inherited	PS	47.2	±2.2	0.046	±0.010	0.0074	±0.0004	0.046	±0.011	0.0074
353362	34	CORE	Inherited	PS	51.0	±2.1	0.052	±0.008	0.0079	±0.0003	0.047	±0.007	0.0079
353362	35	CORE	Lead Loss	PS	40.9	±3.7	0.055	±0.023	0.0065	±0.0006	0.067	±0.030	0.0064
353362	35	RIM	Main Population	PS	43.8	±1.6	0.044	±0.006	0.0068	±0.0003	0.045	±0.006	0.0068
353362	36	RIM	Main Population	PS	43.1	±2.0	0.041	±0.009	0.0067	±0.0003	0.048	±0.011	0.0067
353362	37	RIM	Main Population	PS	43.1	±2.1	0.046	±0.009	0.0067	±0.0003	0.049	±0.010	0.0067
353362	38	RIM	Rejected	PS	33.1	±8.1	0.200	±0.130	0.0067	±0.0013	0.230	±0.150	0.0051
353362	39	RIM	Discordant	PS	41.8	±1.6	0.059	±0.009	0.0067	±0.0003	0.067	±0.011	0.0065
353362	40	CORE	Discordant	PS	43.3	±2.0	0.060	±0.010	0.0069	±0.0003	0.061	±0.010	0.0067
353362	40	RIM	Main Population	PS	43.9	±1.7	0.043	±0.006	0.0068	±0.0003	0.044	±0.006	0.0068
353362	41	RIM	Main Population	PS	42.0	±2.7	0.046	±0.015	0.0066	±0.0004	0.049	±0.018	0.0065
353362	41	CORE	Main Population	PS	44.0	±1.7	0.044	±0.007	0.0069	±0.0003	0.046	±0.008	0.0069

Table A1. 1 continued: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.Table A1. 1: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Area of analysis	Observation	Area	Age $^{206}Pb/^{238}U$ ^{207}Pb corrected (Ma)		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{206}Pb/^{207}Pb$		$^{206}Pb/^{238}U$ ^{207}Pb corrected
353362	42	RIM	Discordant	PS	41.1	±3.6	0.029	±0.015	0.0064	±0.0006	0.029	±0.016	0.0064
353362	43	RIM	Main Population	PS	42.5	±3.0	0.060	±0.022	0.0067	±0.0005	0.060	±0.023	0.0066
353362	44	RIM	Main Population	PS	41.5	±2.6	0.048	±0.014	0.0065	±0.0004	0.048	±0.016	0.0065
353362	44	CORE	Lead Loss	PS	41.0	±2.5	0.041	±0.010	0.0064	±0.0004	0.046	±0.010	0.0064
353362	46	RIM	Main Population	PS	41.1	±2.0	0.046	±0.011	0.0065	±0.0003	0.059	±0.016	0.0064
353362	48	RIM	Main Population	PS	43.7	±2.9	0.037	±0.015	0.0068	±0.0005	0.042	±0.017	0.0068
353362	49	RIM	Main Population	PS	43.7	±2.8	0.040	±0.013	0.0068	±0.0004	0.049	±0.016	0.0068
353363	1	CORE	Main Population	PS	43.4	±3.5	0.038	±0.016	0.0068	±0.0006	0.052	±0.023	0.0068
353363	1	RIM	Inherited	PS	47.6	±6.4	0.048	±0.032	0.0074	±0.0010	0.050	±0.035	0.0074
353363	2	RIM	Inherited	PS	46.8	±4.4	0.043	±0.020	0.0073	±0.0007	0.046	±0.021	0.0073
353363	3	RIM	Main Population	PS	40.2	±3.5	0.052	±0.019	0.0064	±0.0005	0.062	±0.023	0.0063
353363	4	RIM	Main Population	PS	43.5	±4.2	0.062	±0.022	0.0069	±0.0007	0.067	±0.026	0.0068
353363	5	RIM	Main Population	PS	43.5	±5.3	0.079	±0.052	0.0069	±0.0008	0.061	±0.036	0.0068
353363	6	RIM	Discordant	PS	42.5	±1.9	0.065	±0.012	0.0068	±0.0003	0.069	±0.012	0.0066
353363	7	RIM	Inherited	PS	72.7	±2.3	0.076	±0.008	0.0114	±0.0004	0.049	±0.005	0.0113
353363	8	RIM	Main Population	PS	43.9	±2.1	0.038	±0.009	0.0068	±0.0003	0.040	±0.010	0.0068
353363	9	RIM	Main Population	PS	42.0	±1.8	0.039	±0.007	0.0065	±0.0003	0.045	±0.008	0.0065
353363	10	RIM	Main Population	PS	41.1	±2.4	0.039	±0.012	0.0064	±0.0004	0.050	±0.016	0.0064
353363	11	RIM	Main Population	PS	42.1	±2.1	0.048	±0.010	0.0066	±0.0003	0.052	±0.010	0.0065
353363	12	RIM	Discordant	PS	40.7	±4.0	0.065	±0.020	0.0066	±0.0006	0.074	±0.022	0.0063
353363	13	RIM	Main Population	PS	40.6	±1.8	0.048	±0.008	0.0064	±0.0003	0.054	±0.009	0.0063
353363	14	RIM	Inherited	PS	45.5	±3.1	0.032	±0.010	0.0071	±0.0005	0.032	±0.010	0.0071
353363	15	RIM	Main Population	PS	42.8	±5.0	0.053	±0.021	0.0068	±0.0008	0.059	±0.025	0.0067
353363	16	RIM	Discordant	PS	42.5	±2.7	0.065	±0.015	0.0068	±0.0004	0.067	±0.014	0.0066
353363	17	RIM	Titanite/Apatite Inclusions	PS	37.5	±3.3	0.068	±0.020	0.0061	±0.0005	0.084	±0.027	0.0058
353363	18	RIM	Discordant	PS	42.9	±3.0	0.062	±0.017	0.0068	±0.0005	0.062	±0.017	0.0067

Table A1. 1 continued: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.Table A1. 1: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Area of analysis	Observation	Area	Age $^{206}Pb/^{238}U$ ^{207}Pb corrected (Ma)		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{206}Pb/^{207}Pb$		$^{206}Pb/^{238}U$ ^{207}Pb corrected
353363	19	RIM	Main Population	PS	39.6	±2.3	0.047	±0.012	0.0062	±0.0004	0.055	±0.015	0.0062
353363	20	RIM	Main Population	PS	43.2	±2.3	0.047	±0.010	0.0068	±0.0004	0.050	±0.011	0.0067
353363	21	RIM	Main Population	PS	43.0	±2.0	0.039	±0.007	0.0067	±0.0003	0.043	±0.008	0.0067
353363	22	CORE	Inherited	PS	46.9	±3.2	0.030	±0.012	0.0073	±0.0005	0.031	±0.014	0.0073
353363	22	RIM	Main Population	PS	42.3	±1.7	0.043	±0.007	0.0066	±0.0003	0.049	±0.009	0.0066
353363	23	RIM	Main Population	PS	42.1	±2.1	0.041	±0.009	0.0066	±0.0003	0.044	±0.009	0.0066
353363	25	RIM	Inherited	PS	44.3	±1.5	0.043	±0.005	0.0069	±0.0002	0.047	±0.005	0.0069
353363	26	RIM	Rejected	PS	44.3	±2.1	0.053	±0.012	0.0070	±0.0003	0.057	±0.013	0.0069
353363	27	RIM	Inherited	PS	47.8	±2.8	0.072	±0.018	0.0077	±0.0004	0.074	±0.019	0.0074
353363	28	RIM	Main Population	PS	42.4	±1.9	0.045	±0.009	0.0066	±0.0003	0.050	±0.011	0.0066
353363	29	RIM	Discordant	PS	43.4	±2.3	0.034	±0.012	0.0068	±0.0004	0.039	±0.014	0.0068
353363	30	RIM	Inherited	PS	44.5	±1.5	0.046	±0.006	0.0069	±0.0002	0.048	±0.006	0.0069
353363	31	RIM	Main Population	PS	40.6	±2.1	0.043	±0.012	0.0064	±0.0003	0.053	±0.016	0.0063
353363	32	RIM	Discordant	PS	39.1	±2.2	0.050	±0.009	0.0062	±0.0003	0.059	±0.010	0.0061
353363	33	RIM	Inherited	PS	188.0	±5.4	0.208	±0.012	0.0296	±0.0009	0.051	±0.003	0.0296
353363	34	RIM	Main Population	PS	42.0	±2.2	0.050	±0.010	0.0066	±0.0003	0.056	±0.012	0.0065
353363	35	RIM	Main Population	PS	39.8	±2.1	0.037	±0.008	0.0062	±0.0003	0.044	±0.010	0.0062
353363	36	RIM	Main Population	PS	43.4	±3.1	0.040	±0.008	0.0068	±0.0005	0.044	±0.009	0.0068
353363	37	RIM	Main Population	PS	41.4	±2.6	0.040	±0.012	0.0064	±0.0004	0.047	±0.014	0.0064
353363	38	RIM	Discordant	PS	42.5	±2.3	0.069	±0.011	0.0069	±0.0004	0.077	±0.013	0.0066
353363	39	RIM	Main Population	PS	42.2	±1.9	0.047	±0.009	0.0066	±0.0003	0.052	±0.010	0.0066
353363	40	RIM	Titanite/Apatite Inclusions	PS	41.4	±3.9	0.056	±0.021	0.0066	±0.0006	0.064	±0.030	0.0064
353363	41	RIM	Main Population	PS	41.2	±3.6	0.057	±0.026	0.0066	±0.0006	0.063	±0.029	0.0064
353363	42	RIM	Main Population	PS	42.2	±2.1	0.039	±0.010	0.0066	±0.0003	0.048	±0.012	0.0066
353363	43	RIM	Inherited	PS	44.6	±3.0	0.040	±0.013	0.0070	±0.0005	0.043	±0.014	0.0070
353363	44	RIM	Inherited	PS	46.0	±3.0	0.046	±0.016	0.0072	±0.0005	0.048	±0.017	0.0072

Table A1. 1 continued: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.Table A1. 1: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Area of analysis	Observation	Area	Age $^{206}Pb/^{238}U$ ^{207}Pb corrected (Ma)		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{206}Pb/^{207}Pb$		$^{206}Pb/^{238}U$ ^{207}Pb corrected
353363	45	RIM	Inherited	PS	56.2	±9.6	0.057	±0.087	0.0088	±0.0015	0.051	±0.072	0.0088
353363	46	RIM	Rejected	PS	46.3	±5.4	0.038	±0.029	0.0073	±0.0009	0.056	±0.033	0.0072
353363	47	CORE	Main Population	PS	42.3	±3.0	0.041	±0.014	0.0066	±0.0005	0.043	±0.017	0.0066
353363	47	RIM	Main Population	PS	42.3	±2.6	0.044	±0.012	0.0066	±0.0004	0.048	±0.013	0.0066
353363	48	RIM	Inherited	PS	44.3	±3.5	0.050	±0.018	0.0070	±0.0005	0.059	±0.024	0.0069
353363	49	RIM	Main Population	PS	43.2	±3.1	0.038	±0.017	0.0067	±0.0005	0.038	±0.020	0.0067
353368	1	RIM	Main Population	PS	41.9	±2.0	0.047	±0.008	0.0066	±0.0003	0.053	±0.009	0.0065
353368	2	RIM	Main Population	PS	39.8	±3.3	0.035	±0.016	0.0062	±0.0005	0.044	±0.022	0.0062
353368	3	RIM	Main Population	PS	40.4	±1.9	0.041	±0.008	0.0063	±0.0003	0.048	±0.009	0.0063
353368	4	RIM	Main Population	PS	41.3	±2.8	0.042	±0.013	0.0064	±0.0004	0.043	±0.015	0.0064
353368	5	CORE	Main Population	PS	42.0	±2.4	0.043	±0.014	0.0065	±0.0004	0.046	±0.016	0.0065
353368	5	RIM	Main Population	PS	42.5	±2.7	0.048	±0.013	0.0067	±0.0004	0.052	±0.015	0.0066
353368	6	RIM	Main Population	PS	39.1	±1.4	0.037	±0.005	0.0061	±0.0002	0.043	±0.006	0.0061
353368	7	RIM	Inherited	PS	45.3	±5.6	0.071	±0.029	0.0073	±0.0009	0.076	±0.034	0.0071
353368	8	RIM	Main Population	PS	41.1	±4.2	0.039	±0.019	0.0064	±0.0007	0.044	±0.024	0.0064
353368	9	RIM	Inherited	PS	43.3	±3.1	0.050	±0.015	0.0068	±0.0005	0.051	±0.016	0.0067
353368	10	RIM	Main Population	PS	41.9	±2.1	0.048	±0.010	0.0066	±0.0003	0.053	±0.010	0.0065
353368	10	CORE	Inherited	PS	57.8	±5.3	0.064	±0.019	0.0092	±0.0008	0.060	±0.021	0.0090
353368	11	RIM	Main Population	PS	42.2	±3.3	0.039	±0.016	0.0066	±0.0005	0.048	±0.020	0.0066
353368	12	RIM	Main Population	PS	41.4	±1.9	0.047	±0.011	0.0065	±0.0003	0.055	±0.012	0.0064
353368	13	RIM	Inherited	PS	43.2	±2.6	0.042	±0.012	0.0067	±0.0004	0.043	±0.012	0.0067
353368	14	RIM	Main Population	PS	42.2	±2.8	0.044	±0.014	0.0066	±0.0004	0.045	±0.016	0.0066
353368	15	RIM	Discordant	PS	40.5	±3.5	0.056	±0.018	0.0065	±0.0005	0.067	±0.024	0.0063
353368	16	RIM	Main Population	PS	41.5	±4.3	0.046	±0.020	0.0065	±0.0007	0.054	±0.023	0.0065
353368	17	RIM	Main Population	PS	42.6	±3.6	0.050	±0.021	0.0067	±0.0006	0.060	±0.027	0.0066
353368	18	RIM	Main Population	PS	40.7	±2.8	0.038	±0.014	0.0063	±0.0004	0.038	±0.015	0.0063

Table A1. 1 continued: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.Table A1. 1: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Area of analysis	Observation	Area	Age $^{206}Pb/^{238}U$ ^{207}Pb corrected (Ma)		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{206}Pb/^{207}Pb$		$^{206}Pb/^{238}U$ ^{207}Pb corrected
353368	19	RIM	Main Population	PS	40.2	±2.1	0.036	±0.008	0.0063	±0.0003	0.044	±0.010	0.0063
353368	20	RIM	Main Population	PS	42.1	±2.7	0.048	±0.021	0.0066	±0.0004	0.055	±0.024	0.0066
353368	22	RIM	Discordant	PS	42.7	±1.9	0.034	±0.006	0.0066	±0.0003	0.038	±0.006	0.0066
353368	23	RIM	Main Population	PS	40.3	±2.1	0.037	±0.009	0.0063	±0.0003	0.047	±0.011	0.0063
353368	24	RIM	Main Population	PS	39.5	±2.5	0.052	±0.016	0.0063	±0.0004	0.060	±0.019	0.0061
353368	25	RIM	Inherited	PS	43.9	±3.0	0.060	±0.017	0.0070	±0.0005	0.062	±0.018	0.0068
353368	26	RIM	Main Population	PS	38.6	±3.0	0.043	±0.013	0.0061	±0.0005	0.062	±0.021	0.0060
353368	27	RIM	Main Population	PS	41.6	±2.0	0.048	±0.009	0.0066	±0.0003	0.056	±0.010	0.0065
353368	28	RIM	Main Population	PS	39.7	±2.5	0.050	±0.015	0.0063	±0.0004	0.057	±0.017	0.0062
353368	29	RIM	Lead Loss	PS	37.1	±1.6	0.058	±0.010	0.0060	±0.0003	0.070	±0.011	0.0058
353368	30	RIM	Main Population	PS	40.4	±3.5	0.039	±0.017	0.0063	±0.0005	0.048	±0.023	0.0063
353368	31	RIM	Main Population	PS	41.5	±3.6	0.033	±0.015	0.0065	±0.0006	0.047	±0.024	0.0065
353368	32	RIM	Main Population	PS	42.3	±1.6	0.044	±0.006	0.0066	±0.0003	0.047	±0.006	0.0066
353368	33	RIM	Inherited	PS	45.1	±2.4	0.053	±0.013	0.0071	±0.0004	0.059	±0.015	0.0070
353368	34	RIM	Main Population	PS	40.9	±2.8	0.046	±0.016	0.0064	±0.0004	0.055	±0.020	0.0064
353368	35	RIM	Main Population	PS	40.2	±1.7	0.047	±0.008	0.0063	±0.0003	0.052	±0.008	0.0063
353368	36	RIM	Main Population	PS	41.8	±1.7	0.042	±0.006	0.0065	±0.0003	0.048	±0.007	0.0065
353368	37	RIM	Main Population	PS	39.6	±2.6	0.044	±0.012	0.0062	±0.0004	0.048	±0.015	0.0062
353368	38	RIM	Inherited	PS	46.2	±1.8	0.046	±0.007	0.0072	±0.0003	0.044	±0.007	0.0072
353368	39	RIM	Inherited	PS	43.9	±1.6	0.048	±0.008	0.0069	±0.0003	0.051	±0.008	0.0068
353368	40	RIM	Main Population	PS	38.8	±2.1	0.042	±0.011	0.0061	±0.0003	0.053	±0.015	0.0060
353368	41	RIM	Main Population	PS	42.6	±2.8	0.036	±0.010	0.0066	±0.0005	0.045	±0.012	0.0066
353368	42	RIM	Main Population	PS	40.8	±2.4	0.043	±0.010	0.0064	±0.0004	0.054	±0.013	0.0064
353368	43	RIM	Discordant	PS	40.1	±2.5	0.030	±0.009	0.0062	±0.0004	0.035	±0.011	0.0062
353368	44	RIM	Main Population	PS	41.3	±3.3	0.051	±0.017	0.0065	±0.0005	0.061	±0.022	0.0064
353368	45	RIM	Main Population	PS	42.5	±3.1	0.044	±0.013	0.0066	±0.0005	0.048	±0.015	0.0066

Table A1. 1 continued: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.Table A1. 1: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Area of analysis	Observation	Area	Age $^{206}Pb/^{238}U$ ^{207}Pb corrected (Ma)		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{206}Pb/^{207}Pb$		$^{206}Pb/^{238}U$ ^{207}Pb corrected
353368	46	RIM	Main Population	PS	42.1	±4.5	0.052	±0.019	0.0067	±0.0007	0.060	±0.021	0.0065
353368	48	RIM	Main Population	PS	41.3	±2.5	0.041	±0.011	0.0065	±0.0004	0.051	±0.014	0.0064
353368	49	RIM	Main Population	PS	40.9	±1.3	0.043	±0.005	0.0064	±0.0002	0.049	±0.005	0.0064
353369	1	RIM	Main Population	PS	40.3	±4.4	0.036	±0.013	0.0063	±0.0007	0.045	±0.020	0.0063
353369	2	RIM	Main Population	PS	40.9	±2.2	0.039	±0.010	0.0064	±0.0004	0.050	±0.013	0.0064
353369	2	CORE	Main Population	PS	41.5	±1.1	0.047	±0.006	0.0065	±0.0002	0.053	±0.007	0.0065
353369	3	RIM	Main Population	PS	40.2	±1.7	0.034	±0.008	0.0063	±0.0003	0.040	±0.010	0.0063
353369	4	RIM	Main Population	PS	43.2	±1.6	0.043	±0.007	0.0067	±0.0003	0.048	±0.008	0.0067
353369	5	RIM	Inherited	PS	44.1	±2.9	0.031	±0.012	0.0069	±0.0005	0.036	±0.014	0.0069
353369	6	RIM	Main Population	PS	42.6	±1.8	0.043	±0.008	0.0066	±0.0003	0.046	±0.009	0.0066
353369	7	RIM	Main Population	PS	43.1	±2.3	0.044	±0.009	0.0067	±0.0004	0.051	±0.012	0.0067
353369	8	RIM	Main Population	PS	42.2	±2.0	0.045	±0.009	0.0066	±0.0003	0.054	±0.011	0.0066
353369	9	RIM	Inherited	PS	45.2	±2.1	0.046	±0.011	0.0071	±0.0003	0.049	±0.013	0.0070
353369	10	RIM	Main Population	PS	42.4	±1.8	0.039	±0.008	0.0066	±0.0003	0.045	±0.010	0.0066
353369	11	RIM	Lead Loss	PS	36.7	±2.0	0.042	±0.010	0.0058	±0.0003	0.053	±0.015	0.0057
353369	11	CORE	Main Population	PS	40.4	±2.0	0.050	±0.010	0.0063	±0.0003	0.053	±0.010	0.0063
353369	12	RIM	Main Population	PS	43.3	±2.2	0.045	±0.011	0.0068	±0.0003	0.050	±0.013	0.0067
353369	13	RIM	Inherited	PS	46.1	±2.2	0.040	±0.013	0.0072	±0.0004	0.041	±0.013	0.0072
353369	14	RIM	Inherited	PS	43.5	±2.0	0.047	±0.009	0.0068	±0.0003	0.051	±0.011	0.0068
353369	15	RIM	Main Population	PS	40.4	±2.0	0.034	±0.007	0.0063	±0.0003	0.042	±0.010	0.0063
353369	16	RIM	Main Population	PS	43.2	±2.0	0.042	±0.009	0.0067	±0.0003	0.044	±0.010	0.0067
353369	17	RIM	Main Population	PS	40.8	±1.9	0.044	±0.007	0.0064	±0.0003	0.050	±0.009	0.0063
353369	18	RIM	Main Population	PS	40.3	±2.4	0.045	±0.011	0.0064	±0.0004	0.061	±0.016	0.0063
353369	19	RIM	Lead Loss	PS	37.5	±1.4	0.043	±0.007	0.0059	±0.0002	0.052	±0.009	0.0058
353369	20	RIM	Main Population	PS	39.9	±1.9	0.047	±0.009	0.0063	±0.0003	0.058	±0.012	0.0062
353369	21	RIM	Titanite/Apatite Inclusions	PS	41.4	±1.6	0.070	±0.013	0.0067	±0.0003	0.075	±0.014	0.0064

Table A1. 1 continued: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.Table A1. 1: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Area of analysis	Observation	Area	Age $^{206}Pb/^{238}U$ ^{207}Pb corrected (Ma)		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{206}Pb/^{207}Pb$		$^{206}Pb/^{238}U$ ^{207}Pb corrected
353369	22	RIM	Main Population	PS	40.8	±1.4	0.043	±0.006	0.0064	±0.0002	0.049	±0.007	0.0064
353369	23	RIM	Main Population	PS	41.2	±1.5	0.044	±0.008	0.0064	±0.0002	0.051	±0.010	0.0064
353369	24	RIM	Main Population	PS	41.2	±1.9	0.039	±0.009	0.0064	±0.0003	0.044	±0.010	0.0064
353369	25	RIM	Main Population	PS	41.4	±1.7	0.048	±0.008	0.0065	±0.0003	0.057	±0.011	0.0064
353369	26	RIM	Main Population	PS	39.5	±2.3	0.050	±0.014	0.0063	±0.0004	0.067	±0.020	0.0061
353369	27	RIM	Inherited	PS	48.7	±2.1	0.043	±0.009	0.0076	±0.0003	0.041	±0.009	0.0076
353369	28	RIM	Main Population	PS	40.9	±2.1	0.050	±0.010	0.0065	±0.0003	0.058	±0.012	0.0064
353369	29	RIM	Main Population	PS	42.2	±2.4	0.049	±0.011	0.0066	±0.0004	0.053	±0.013	0.0066
353369	30	RIM	Main Population	PS	42.1	±1.8	0.037	±0.008	0.0066	±0.0003	0.042	±0.010	0.0066
353369	31	RIM	Main Population	PS	39.2	±2.5	0.040	±0.011	0.0061	±0.0004	0.045	±0.012	0.0061
353369	32	RIM	Main Population	PS	39.7	±1.5	0.044	±0.004	0.0062	±0.0002	0.051	±0.006	0.0062
353369	33	RIM	Main Population	PS	42.1	±14.0	0.038	±0.042	0.0066	±0.0021	0.052	±0.056	0.0066
353369	34	RIM	Main Population	PS	43.0	±1.6	0.044	±0.008	0.0067	±0.0003	0.048	±0.009	0.0067
353369	35	RIM	Main Population	PS	42.9	±1.7	0.040	±0.009	0.0067	±0.0003	0.044	±0.011	0.0067
353369	36	RIM	Inherited	PS	45.0	±2.7	0.037	±0.010	0.0070	±0.0004	0.043	±0.013	0.0070
353369	37	RIM	Main Population	PS	43.1	±2.2	0.052	±0.010	0.0068	±0.0004	0.056	±0.012	0.0067
353369	38	RIM	Inherited	PS	48.0	±2.9	0.052	±0.009	0.0075	±0.0005	0.052	±0.010	0.0075
353369	39	RIM	Titanite/Apatite Inclusions	PS	43.0	±2.3	0.051	±0.011	0.0068	±0.0004	0.057	±0.011	0.0067
353369	40	RIM	Main Population	PS	41.9	±1.4	0.046	±0.007	0.0066	±0.0002	0.054	±0.009	0.0065
353369	41	RIM	Main Population	PS	41.8	±1.9	0.041	±0.008	0.0065	±0.0003	0.047	±0.010	0.0065
353369	42	RIM	Discordant	PS	41.4	±3.4	0.066	±0.022	0.0067	±0.0005	0.076	±0.026	0.0064
353369	43	RIM	Main Population	PS	41.9	±2.7	0.042	±0.010	0.0066	±0.0004	0.050	±0.013	0.0065
353369	44	RIM	Main Population	PS	41.1	±1.8	0.049	±0.010	0.0065	±0.0003	0.059	±0.013	0.0064
353369	45	RIM	Main Population	PS	41.6	±1.5	0.041	±0.007	0.0065	±0.0002	0.047	±0.008	0.0065
353369	46	RIM	Main Population	PS	42.4	±1.7	0.038	±0.007	0.0066	±0.0003	0.043	±0.009	0.0066
353369	47	RIM	Main Population	PS	41.3	±2.3	0.040	±0.013	0.0064	±0.0004	0.048	±0.015	0.0064

Table A1. 1 continued: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.Table A1. 1: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Area of analysis	Observation	Area	Age $^{206}Pb/^{238}U$ ^{207}Pb corrected (Ma)		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{206}Pb/^{207}Pb$		$^{206}Pb/^{238}U$ ^{207}Pb corrected
353369	48	RIM	Inherited	PS	44.7	±1.8	0.042	±0.008	0.0070	±0.0003	0.046	±0.009	0.0070
353369	49	RIM	Discordant	PS	42.8	±2.3	0.062	±0.016	0.0068	±0.0004	0.068	±0.017	0.0067
353369	50	RIM	Discordant	PS	39.9	±2.5	0.062	±0.018	0.0064	±0.0004	0.066	±0.021	0.0062
353369	51	RIM	Main Population	PS	42.1	±1.0	0.043	±0.004	0.0066	±0.0002	0.048	±0.005	0.0066
353381	1	RIM	Discordant	UR	61.1	±4.8	0.092	±0.028	0.0098	±0.0008	0.069	±0.022	0.0095
353381	2	RIM	Lead Loss	UR	57.2	±1.8	0.057	±0.004	0.0089	±0.0003	0.046	±0.003	0.0089
353381	3	RIM	Lead Loss	UR	59.5	±2.3	0.058	±0.007	0.0093	±0.0004	0.044	±0.005	0.0093
353381	4	RIM	Main Population	UR	61.5	±2.2	0.068	±0.010	0.0096	±0.0004	0.052	±0.008	0.0096
353381	5	RIM	Main Population	UR	62.2	±2.4	0.060	±0.008	0.0097	±0.0004	0.045	±0.006	0.0097
353381	6	RIM	Main Population	UR	61.6	±3.3	0.072	±0.010	0.0097	±0.0005	0.054	±0.008	0.0096
353381	7	RIM	Inherited	UR	65.4	±2.7	0.064	±0.010	0.0102	±0.0004	0.047	±0.008	0.0102
353381	8	RIM	Main Population	UR	60.8	±2.2	0.064	±0.007	0.0095	±0.0003	0.049	±0.005	0.0095
353381	9	RIM	Titanite/Apatite Inclusions	UR	61.9	±1.8	0.064	±0.005	0.0097	±0.0003	0.049	±0.004	0.0096
353381	10	CORE	Main Population	UR	61.1	±2.4	0.060	±0.007	0.0095	±0.0004	0.047	±0.006	0.0095
353381	10	RIM	Inherited	UR	64.7	±2.0	0.066	±0.007	0.0101	±0.0003	0.047	±0.005	0.0101
353381	11	RIM	Inherited	UR	73.7	±2.6	0.074	±0.011	0.0115	±0.0004	0.047	±0.007	0.0115
353381	12	RIM	Inherited	UR	73.0	±5.6	0.070	±0.022	0.0114	±0.0009	0.047	±0.015	0.0114
353381	13	RIM	Titanite/Apatite Inclusions	UR	209.3	±97.0	2.800	±2.100	0.0330	±0.0160	-1.000	±3.600	0.0330
353381	14	RIM	Main Population	UR	63.4	±2.5	0.066	±0.010	0.0099	±0.0004	0.048	±0.008	0.0099
353381	15	RIM	Main Population	UR	62.5	±1.9	0.062	±0.005	0.0098	±0.0003	0.046	±0.003	0.0098
353381	16	CORE	Inherited	UR	65.1	±2.3	0.065	±0.009	0.0102	±0.0004	0.046	±0.006	0.0102
353381	16	RIM	Main Population	UR	60.4	±2.1	0.061	±0.007	0.0094	±0.0003	0.047	±0.006	0.0094
353381	17	RIM	Inherited	UR	66.6	±2.8	0.073	±0.011	0.0104	±0.0004	0.049	±0.007	0.0104
353381	18	RIM	Inherited	UR	65.3	±2.1	0.060	±0.006	0.0102	±0.0003	0.043	±0.005	0.0102
353381	18	RIM	Main Population	UR	61.5	±1.8	0.061	±0.007	0.0096	±0.0003	0.046	±0.005	0.0096
353381	19	RIM	Lead Loss	UR	59.8	±1.9	0.059	±0.007	0.0093	±0.0003	0.045	±0.005	0.0093

Table A1. 1 continued: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.Table A1. 1: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Area of analysis	Observation	Area	Age $^{206}Pb/^{238}U$ ^{207}Pb corrected (Ma)		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{206}Pb/^{207}Pb$		$^{206}Pb/^{238}U$ ^{207}Pb corrected
353381	20	RIM	Inherited	UR	66.1	±4.1	0.053	±0.015	0.0103	±0.0007	0.038	±0.010	0.0103
353381	21	RIM	Main Population	UR	61.1	±2.3	0.051	±0.008	0.0095	±0.0004	0.040	±0.006	0.0095
353381	23	RIM	Lead Loss	UR	56.6	±2.0	0.056	±0.009	0.0088	±0.0003	0.046	±0.007	0.0088
353381	24	RIM	Main Population	UR	62.5	±1.7	0.060	±0.004	0.0097	±0.0003	0.044	±0.003	0.0097
353381	25	RIM	Lead Loss	UR	59.2	±2.0	0.056	±0.007	0.0092	±0.0003	0.044	±0.006	0.0092
353381	26	RIM	Lead Loss	UR	59.5	±2.2	0.060	±0.008	0.0093	±0.0003	0.046	±0.006	0.0093
353381	27	RIM	Main Population	UR	62.8	±3.8	0.071	±0.014	0.0099	±0.0006	0.053	±0.012	0.0098
353381	28	RIM	Main Population	UR	62.5	±2.2	0.058	±0.007	0.0097	±0.0004	0.043	±0.006	0.0097
353381	29	RIM	Main Population	UR	63.1	±3.4	0.066	±0.013	0.0099	±0.0005	0.050	±0.009	0.0098
353381	30	RIM	Lead Loss	UR	57.9	±2.0	0.052	±0.005	0.0090	±0.0003	0.043	±0.004	0.0090
353381	31	RIM	Discordant	UR	60.4	±2.7	0.350	±0.041	0.0119	±0.0004	0.213	±0.024	0.0094
353381	32	RIM	Lead Loss	UR	59.2	±1.9	0.057	±0.006	0.0092	±0.0003	0.045	±0.005	0.0092
353381	33	RIM	Inherited	UR	65.7	±2.9	0.075	±0.015	0.0103	±0.0005	0.051	±0.010	0.0102
353381	33	RIM	Main Population	UR	63.3	±3.1	0.066	±0.011	0.0099	±0.0005	0.049	±0.008	0.0099
353381	34	RIM	Rejected	UR	69.8	±6.3	0.074	±0.026	0.0109	±0.0010	0.049	±0.019	0.0109
353381	35	RIM	Main Population	UR	61.5	±3.0	0.053	±0.009	0.0096	±0.0005	0.042	±0.007	0.0096
353381	36	RIM	Main Population	UR	60.6	±2.3	0.065	±0.009	0.0095	±0.0004	0.050	±0.007	0.0094
353381	37	RIM	Discordant	UR	60.3	±6.5	0.105	±0.040	0.0098	±0.0010	0.081	±0.031	0.0094
353381	38	RIM	Main Population	UR	63.8	±2.8	0.061	±0.010	0.0099	±0.0004	0.046	±0.007	0.0099
353381	39	RIM	Inherited	UR	65.8	±3.3	0.065	±0.016	0.0103	±0.0005	0.046	±0.011	0.0103
353381	40	RIM	Lead Loss	UR	58.8	±1.8	0.063	±0.005	0.0092	±0.0003	0.049	±0.004	0.0092
353381	41	RIM	Main Population	UR	61.3	±2.1	0.069	±0.007	0.0096	±0.0003	0.052	±0.006	0.0096
353381	42	RIM	Rejected	UR	58.9	±2.9	0.075	±0.013	0.0093	±0.0005	0.060	±0.011	0.0092
353381	42	RIM	Main Population	UR	62.7	±2.2	0.065	±0.010	0.0098	±0.0004	0.048	±0.007	0.0098
353381	43	RIM	Rejected	UR	94.7	±18.0	0.083	±0.070	0.0148	±0.0028	0.027	±0.021	0.0148
353381	44	RIM	Main Population	UR	61.2	±1.7	0.063	±0.006	0.0096	±0.0003	0.048	±0.004	0.0095

Table A1. 1 continued: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.Table A1. 1: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Area of analysis	Observation	Area	Age $^{206}Pb/^{238}U$ ^{207}Pb corrected (Ma)		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{206}Pb/^{207}Pb$		$^{206}Pb/^{238}U$ ^{207}Pb corrected
353381	45	RIM	Discordant	UR	62.7	±3.5	0.050	±0.013	0.0098	±0.0006	0.039	±0.012	0.0098
353381	46	RIM	Inherited	UR	64.2	±3.6	0.121	±0.034	0.0104	±0.0006	0.075	±0.017	0.0100
353381	47	RIM	Main Population	UR	62.9	±2.4	0.063	±0.009	0.0098	±0.0004	0.048	±0.007	0.0098
353381	48	RIM	Inherited	UR	68.9	±2.8	0.072	±0.007	0.0108	±0.0005	0.049	±0.005	0.0107
353381	49	RIM	Lead Loss	UR	58.2	±2.0	0.057	±0.008	0.0091	±0.0003	0.046	±0.007	0.0091
353384	1	RIM	Inherited	PB	51.9	±2.2	0.050	±0.009	0.0081	±0.0004	0.047	±0.009	0.0081
353384	2	RIM	Titanite/Apatite Inclusions	PB	50.3	±4.0	0.097	±0.032	0.0084	±0.0006	0.096	±0.032	0.0078
353384	3	RIM	Inherited	PB	58.8	±2.9	0.054	±0.011	0.0092	±0.0005	0.045	±0.010	0.0092
353384	4	RIM	Main Population	PB	47.8	±1.4	0.045	±0.006	0.0074	±0.0002	0.043	±0.006	0.0074
353384	5	RIM	Main Population	PB	49.6	±2.3	0.044	±0.009	0.0077	±0.0004	0.043	±0.008	0.0077
353384	6	RIM	Inherited	PB	51.8	±2.0	0.059	±0.006	0.0081	±0.0003	0.053	±0.005	0.0081
353384	7	RIM	Inherited	PB	56.5	±3.8	0.062	±0.020	0.0088	±0.0006	0.044	±0.014	0.0088
353384	8	RIM	Discordant	PB	47.6	±3.0	0.068	±0.018	0.0076	±0.0005	0.067	±0.018	0.0074
353384	9	RIM	Inherited	PB	59.4	±3.0	0.059	±0.011	0.0093	±0.0005	0.047	±0.009	0.0093
353384	10	RIM	Lead Loss	PB	46.2	±3.9	0.091	±0.028	0.0076	±0.0006	0.088	±0.031	0.0072
353384	11	RIM	Inherited	PB	56.0	±2.7	0.048	±0.011	0.0087	±0.0004	0.042	±0.010	0.0087
353384	12	RIM	Main Population	PB	47.5	±3.6	0.045	±0.014	0.0074	±0.0006	0.047	±0.015	0.0074
353384	13	RIM	Discordant	PB	50.5	±2.1	0.042	±0.009	0.0079	±0.0003	0.037	±0.008	0.0079
353384	13	CORE	Main Population	PB	48.9	±1.9	0.048	±0.010	0.0076	±0.0003	0.045	±0.009	0.0076
353384	14	RIM	Discordant	PB	48.4	±3.1	0.066	±0.017	0.0077	±0.0005	0.061	±0.016	0.0075
353384	15	RIM	Main Population	PB	48.9	±4.5	0.051	±0.019	0.0077	±0.0007	0.051	±0.018	0.0076
353384	16	RIM	Main Population	PB	48.2	±2.3	0.045	±0.011	0.0075	±0.0004	0.045	±0.011	0.0075
353384	17	RIM	Lead Loss	PB	46.8	±2.5	0.070	±0.016	0.0075	±0.0004	0.070	±0.016	0.0073
353384	18	RIM	Inherited	PB	59.4	±6.5	0.102	±0.046	0.0095	±0.0010	0.067	±0.033	0.0093
353384	19	RIM	Discordant	PB	47.8	±3.6	0.105	±0.026	0.0080	±0.0006	0.102	±0.029	0.0074
353384	20	RIM	Inherited	PB	66.6	±3.8	0.062	±0.016	0.0104	±0.0006	0.046	±0.012	0.0104

Table A1. 1 continued: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.Table A1. 1: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Area of analysis	Observation	Area	Age $^{206}Pb/^{238}U$ ^{207}Pb corrected (Ma)		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{206}Pb/^{207}Pb$		$^{206}Pb/^{238}U$ ^{207}Pb corrected
353385	1	RIM	Inherited	UR	59.6	±2.9	0.069	±0.011	0.0094	±0.0005	0.054	±0.009	0.0093
353385	2	RIM	Main Population	UR	51.6	±2.5	0.049	±0.006	0.0080	±0.0004	0.046	±0.006	0.0080
353385	3	RIM	Discordant	UR	51.9	±4.6	0.037	±0.019	0.0081	±0.0007	0.044	±0.026	0.0081
353385	4	RIM	Inherited	UR	68.3	±5.5	0.054	±0.017	0.0107	±0.0009	0.034	±0.013	0.0107
353385	5	RIM	Inherited	UR	55.0	±4.6	0.105	±0.030	0.0090	±0.0007	0.087	±0.032	0.0086
353385	6	RIM	Inherited	UR	59.4	±2.8	0.075	±0.009	0.0094	±0.0004	0.058	±0.008	0.0093
353385	7	RIM	Inherited	UR	58.3	±5.8	0.118	±0.034	0.0096	±0.0009	0.087	±0.025	0.0091
353385	8	RIM	Discordant	UR	51.6	±3.2	0.040	±0.011	0.0080	±0.0005	0.039	±0.010	0.0080
353385	9	RIM	Inherited	UR	55.3	±2.5	0.054	±0.007	0.0086	±0.0004	0.047	±0.006	0.0086
353385	10	RIM	Main Population	UR	51.0	±2.1	0.053	±0.006	0.0080	±0.0003	0.048	±0.006	0.0079
353385	11	RIM	Inherited	UR	62.5	±3.5	0.054	±0.011	0.0097	±0.0006	0.043	±0.009	0.0097
353385	12	RIM	Rejected	UR	59.6	±3.3	0.092	±0.015	0.0096	±0.0005	0.070	±0.011	0.0093
353385	12	RIM	Inherited	UR	58.7	±3.7	0.110	±0.019	0.0096	±0.0006	0.085	±0.015	0.0092
353385	13	RIM	Inherited	UR	58.6	±2.8	0.069	±0.013	0.0092	±0.0004	0.053	±0.010	0.0091
353385	14	RIM	Inherited	UR	55.2	±4.6	0.069	±0.017	0.0088	±0.0007	0.062	±0.016	0.0086
353385	15	RIM	Lead Loss	UR	49.1	±2.2	0.056	±0.008	0.0077	±0.0003	0.054	±0.008	0.0077
353385	16	RIM	Inherited	UR	63.0	±3.4	0.074	±0.014	0.0099	±0.0005	0.053	±0.010	0.0098
353385	17	RIM	Inherited	UR	54.9	±4.8	0.058	±0.022	0.0087	±0.0008	0.057	±0.025	0.0086
353385	18	RIM	Inherited	UR	60.2	±3.5	0.066	±0.014	0.0094	±0.0006	0.051	±0.011	0.0094
353385	19	RIM	Inherited	UR	57.1	±2.9	0.065	±0.014	0.0090	±0.0005	0.054	±0.012	0.0089
353385	20	RIM	Main Population	UR	53.9	±3.6	0.049	±0.014	0.0084	±0.0006	0.042	±0.012	0.0084
353385	21	RIM	Inherited	UR	66.0	±4.5	0.067	±0.015	0.0103	±0.0007	0.049	±0.011	0.0103
353385	22	RIM	Main Population	UR	52.4	±2.0	0.053	±0.004	0.0082	±0.0003	0.047	±0.004	0.0082
353385	23	RIM	Inherited	UR	60.7	±5.8	0.063	±0.027	0.0095	±0.0009	0.049	±0.022	0.0095
353385	24	RIM	Main Population	UR	53.7	±2.4	0.053	±0.007	0.0084	±0.0004	0.045	±0.006	0.0084
353385	25	RIM	Inherited	UR	61.4	±6.0	0.122	±0.034	0.0102	±0.0009	0.095	±0.029	0.0096

Table A1. 1 continued: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.Table A1. 1: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Area of analysis	Observation	Area	Age $^{206}Pb/^{238}U$ ^{207}Pb corrected (Ma)		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{206}Pb/^{207}Pb$		$^{206}Pb/^{238}U$ ^{207}Pb corrected
353385	26	RIM	Inherited	UR	58.1	±4.6	0.107	±0.021	0.0095	±0.0007	0.082	±0.017	0.0091
353385	27	CORE	Inherited	UR	55.1	±3.2	0.077	±0.017	0.0087	±0.0005	0.061	±0.014	0.0086
353385	27	RIM	Inherited	UR	55.4	±3.8	0.079	±0.019	0.0089	±0.0006	0.069	±0.017	0.0086
353385	28	RIM	Inherited	UR	56.7	±3.4	0.054	±0.011	0.0088	±0.0005	0.046	±0.010	0.0088
353385	29	RIM	Main Population	UR	52.7	±2.8	0.054	±0.013	0.0083	±0.0004	0.051	±0.013	0.0082
353385	30	RIM	Main Population	UR	51.9	±2.4	0.049	±0.007	0.0081	±0.0004	0.044	±0.007	0.0081
353385	30	CORE	Inherited	UR	55.1	±2.9	0.052	±0.008	0.0086	±0.0005	0.048	±0.008	0.0086
353385	31	CORE	Inherited	UR	62.0	±4.4	0.054	±0.020	0.0097	±0.0007	0.043	±0.016	0.0097
353385	31	RIM	Inherited	UR	55.4	±3.8	0.053	±0.014	0.0087	±0.0006	0.050	±0.014	0.0086
353385	32	RIM	Rejected	UR	57.3	±2.5	0.061	±0.007	0.0090	±0.0004	0.050	±0.006	0.0089
353385	33	RIM	Inherited	UR	56.4	±2.9	0.055	±0.008	0.0088	±0.0005	0.045	±0.007	0.0088
353385	33	CORE	Lead Loss	UR	48.4	±2.4	0.058	±0.008	0.0076	±0.0004	0.053	±0.007	0.0075
353385	34	RIM	Main Population	UR	51.2	±2.9	0.051	±0.011	0.0080	±0.0005	0.046	±0.010	0.0080
353388	1	RIM	Main Population	PB	45.1	±3.2	0.048	±0.012	0.0070	±0.0005	0.050	±0.014	0.0070
353388	2	RIM	Main Population	PB	42.4	±2.8	0.038	±0.014	0.0066	±0.0004	0.049	±0.019	0.0066
353388	3	RIM	Main Population	PB	47.0	±4.0	0.043	±0.018	0.0073	±0.0006	0.045	±0.019	0.0073
353388	4	RIM	Main Population	PB	41.8	±2.8	0.051	±0.012	0.0066	±0.0004	0.060	±0.015	0.0065
353388	5	RIM	Main Population	PB	46.9	±3.9	0.052	±0.018	0.0073	±0.0006	0.051	±0.019	0.0073
353388	6	RIM	Inherited	PB	76.2	±4.5	0.086	±0.016	0.0120	±0.0007	0.055	±0.011	0.0119
353388	7	RIM	Discordant	PB	46.3	±3.2	0.071	±0.017	0.0075	±0.0005	0.074	±0.018	0.0072
353388	8	RIM	Main Population	PB	42.4	±3.0	0.044	±0.013	0.0066	±0.0005	0.045	±0.015	0.0066
353388	9	RIM	Discordant	PB	46.1	±3.3	0.037	±0.013	0.0072	±0.0005	0.041	±0.016	0.0072
353388	10	RIM	Discordant	PB	45.8	±5.8	0.027	±0.021	0.0071	±0.0009	0.035	±0.028	0.0071
353388	11	RIM	Main Population	PB	45.8	±3.1	0.059	±0.016	0.0073	±0.0005	0.061	±0.017	0.0071
353388	12	RIM	Main Population	PB	45.8	±4.9	0.053	±0.029	0.0072	±0.0008	0.057	±0.032	0.0071
353388	13	RIM	Discordant	PB	47.0	±4.1	0.037	±0.015	0.0074	±0.0006	0.050	±0.023	0.0073

Table A1. 1 continued: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.Table A1. 1: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Area of analysis	Observation	Area	Age $^{206}Pb/^{238}U$ ^{207}Pb corrected (Ma)		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{206}Pb/^{207}Pb$		$^{206}Pb/^{238}U$ ^{207}Pb corrected
353388	14	RIM	Main Population	PB	46.2	±5.9	0.039	±0.032	0.0072	±0.0009	0.034	±0.031	0.0072
353388	15	RIM	Main Population	PB	46.8	±3.7	0.054	±0.016	0.0073	±0.0006	0.052	±0.015	0.0073
353388	16	RIM	Main Population	PB	47.2	±4.5	0.052	±0.019	0.0074	±0.0007	0.054	±0.021	0.0074
353388	17	RIM	Inherited	PB	75.8	±4.2	0.108	±0.021	0.0121	±0.0007	0.064	±0.012	0.0118
353388	19	RIM	Main Population	PB	48.2	±3.8	0.043	±0.017	0.0075	±0.0006	0.043	±0.017	0.0075
353388	20	RIM	Main Population	PB	46.9	±3.4	0.051	±0.016	0.0074	±0.0005	0.052	±0.017	0.0073
353388	21	RIM	Main Population	PB	46.1	±3.5	0.046	±0.019	0.0072	±0.0006	0.046	±0.020	0.0072
353388	22	RIM	Main Population	PB	44.6	±4.6	0.055	±0.021	0.0071	±0.0007	0.062	±0.028	0.0069
353388	23	RIM	Main Population	PB	46.5	±3.1	0.042	±0.014	0.0072	±0.0005	0.042	±0.015	0.0072
353388	24	RIM	Main Population	PB	44.8	±2.7	0.047	±0.012	0.0070	±0.0004	0.050	±0.013	0.0070
353388	25	RIM	Main Population	PB	43.9	±3.6	0.047	±0.016	0.0069	±0.0006	0.056	±0.021	0.0068
353388	26	RIM	Discordant	PB	44.4	±2.9	0.032	±0.010	0.0069	±0.0005	0.035	±0.011	0.0069
353388	27	RIM	Main Population	PB	41.3	±2.9	0.052	±0.021	0.0066	±0.0005	0.066	±0.029	0.0064
353388	28	RIM	Discordant	PB	43.1	±3.0	0.057	±0.012	0.0068	±0.0005	0.061	±0.014	0.0067
353388	29	RIM	Lead Loss	PB	35.9	±2.3	0.034	±0.008	0.0056	±0.0004	0.045	±0.010	0.0056
353388	30	RIM	Discordant	PB	48.7	±4.6	0.025	±0.021	0.0076	±0.0007	0.023	±0.019	0.0076
353388	31	RIM	Main Population	PB	48.0	±3.3	0.045	±0.012	0.0075	±0.0005	0.044	±0.012	0.0075
353388	32	RIM	Discordant	PB	45.3	±7.7	0.097	±0.057	0.0077	±0.0012	0.114	±0.068	0.0070
353388	33	RIM	Main Population	PB	47.5	±3.6	0.044	±0.011	0.0074	±0.0006	0.046	±0.013	0.0074
353388	34	RIM	Main Population	PB	47.1	±3.1	0.041	±0.010	0.0073	±0.0005	0.046	±0.011	0.0073
353388	35	RIM	Main Population	PB	44.8	±4.6	0.044	±0.017	0.0071	±0.0007	0.058	±0.023	0.0070
353388	36	RIM	Main Population	PB	45.3	±3.5	0.037	±0.013	0.0071	±0.0005	0.037	±0.014	0.0071
353388	37	RIM	Lead Loss	PB	27.9	±19.0	0.100	±0.230	0.0065	±0.0030	0.310	±0.200	0.0043
353388	38	RIM	Main Population	PB	42.7	±2.8	0.050	±0.014	0.0067	±0.0004	0.053	±0.015	0.0066
353388	39	RIM	Main Population	PB	46.6	±4.0	0.044	±0.016	0.0073	±0.0006	0.048	±0.020	0.0073
353388	40	RIM	Main Population	PB	47.6	±3.7	0.048	±0.017	0.0074	±0.0006	0.050	±0.019	0.0074

Table A1. 1 continued: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.Table A1. 1: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Area of analysis	Observation	Area	Age $^{206}Pb/^{238}U$ ^{207}Pb corrected (Ma)		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{206}Pb/^{207}Pb$		$^{206}Pb/^{238}U$ ^{207}Pb corrected
353388	41	RIM	Titanite/Apatite Inclusions	PB	42.5	±5.0	0.125	±0.035	0.0078	±0.0008	0.164	±0.058	0.0066
353388	42	RIM	Rejected	PB	49.4	±7.3	0.038	±0.055	0.0078	±0.0011	0.058	±0.051	0.0077
353388	43	RIM	Main Population	PB	41.7	±3.1	0.047	±0.013	0.0066	±0.0005	0.055	±0.016	0.0065
353388	44	RIM	Lead Loss	PB	38.5	±3.9	0.118	±0.038	0.0068	±0.0006	0.137	±0.050	0.0060
353388	45	RIM	Main Population	PB	44.8	±3.5	0.051	±0.017	0.0071	±0.0006	0.058	±0.021	0.0070
353388	46	RIM	Main Population	PB	43.2	±3.4	0.042	±0.013	0.0067	±0.0005	0.047	±0.015	0.0067
353388	47	RIM	Titanite/Apatite Inclusions	PB	41.6	±9.0	0.410	±0.150	0.0090	±0.0014	0.269	±0.056	0.0065
353388	48	RIM	Main Population	PB	41.6	±4.0	0.040	±0.026	0.0065	±0.0006	0.037	±0.031	0.0065
353388	49	RIM	Main Population	PB	43.6	±2.5	0.051	±0.010	0.0069	±0.0004	0.058	±0.012	0.0068
353388	50	RIM	Inherited	PB	62.6	±5.9	0.062	±0.027	0.0098	±0.0009	0.048	±0.021	0.0098
353390	1	RIM	Titanite/Apatite Inclusions	PB	46.0	±3.0	0.064	±0.013	0.0074	±0.0005	0.067	±0.015	0.0072
353390	2	CORE	Inherited	PB	61.4	±4.3	0.068	±0.018	0.0096	±0.0007	0.050	±0.014	0.0096
353390	2	RIM	Inherited	PB	53.0	±2.5	0.057	±0.008	0.0083	±0.0004	0.052	±0.008	0.0083
353390	3	RIM	Discordant	PB	44.3	±2.8	0.035	±0.007	0.0069	±0.0004	0.041	±0.009	0.0069
353390	4	RIM	Main Population	PB	44.1	±4.2	0.058	±0.019	0.0071	±0.0007	0.067	±0.024	0.0069
353390	5	RIM	Main Population	PB	44.3	±2.5	0.050	±0.010	0.0070	±0.0004	0.056	±0.011	0.0069
353390	6	RIM	Lead Loss	PB	39.7	±2.8	0.058	±0.016	0.0063	±0.0004	0.068	±0.018	0.0062
353390	7	RIM	Lead Loss	PB	40.3	±1.9	0.041	±0.006	0.0063	±0.0003	0.046	±0.007	0.0063
353390	8	RIM	Main Population	PB	42.1	±1.9	0.046	±0.006	0.0066	±0.0003	0.052	±0.007	0.0066
353390	9	RIM	Titanite/Apatite Inclusions	PB	41.4	±1.9	0.045	±0.006	0.0065	±0.0003	0.051	±0.007	0.0064
353390	10	RIM	Main Population	PB	42.8	±2.8	0.039	±0.010	0.0067	±0.0004	0.048	±0.014	0.0067
353390	11	RIM	Discordant	PB	45.1	±3.1	0.033	±0.009	0.0070	±0.0005	0.035	±0.010	0.0070
353390	12	RIM	Main Population	PB	45.5	±3.8	0.043	±0.015	0.0071	±0.0006	0.046	±0.019	0.0071
353390	13	CORE	Discordant	PB	41.5	±2.6	0.058	±0.013	0.0066	±0.0004	0.068	±0.015	0.0065
353390	13	RIM	Main Population	PB	42.6	±1.8	0.044	±0.006	0.0066	±0.0003	0.048	±0.006	0.0066
353390	14	RIM	Lead Loss	PB	40.0	±2.9	0.043	±0.014	0.0062	±0.0005	0.049	±0.017	0.0062

Table A1. 1 continued: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.Table A1. 1: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Area of analysis	Observation	Area	Age $^{206}Pb/^{238}U$ ^{207}Pb corrected (Ma)		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{206}Pb/^{207}Pb$		$^{206}Pb/^{238}U$ ^{207}Pb corrected
353390	15	RIM	Main Population	PB	43.4	±2.7	0.043	±0.011	0.0068	±0.0004	0.046	±0.011	0.0068
353390	16	RIM	Main Population	PB	45.8	±3.4	0.056	±0.015	0.0072	±0.0005	0.057	±0.016	0.0071
353390	17	RIM	Discordant	PB	43.8	±2.2	0.032	±0.011	0.0068	±0.0004	0.036	±0.012	0.0068
353390	18	RIM	Lead Loss	PB	40.4	±2.2	0.059	±0.041	0.0065	±0.0003	0.072	±0.053	0.0063
353390	19	RIM	Main Population	PB	41.9	±3.1	0.048	±0.014	0.0066	±0.0005	0.057	±0.017	0.0065
353390	20	RIM	Main Population	PB	42.0	±2.1	0.040	±0.008	0.0065	±0.0003	0.044	±0.009	0.0065
353390	21	RIM	Main Population	PB	42.7	±3.6	0.042	±0.015	0.0067	±0.0006	0.055	±0.020	0.0067
353390	22	RIM	Main Population	PB	43.8	±2.7	0.037	±0.011	0.0068	±0.0004	0.040	±0.012	0.0068
353390	23	RIM	Main Population	PB	42.7	±2.5	0.040	±0.010	0.0066	±0.0004	0.047	±0.012	0.0066
353390	24	RIM	Lead Loss	PB	38.2	±3.4	0.051	±0.019	0.0061	±0.0005	0.067	±0.026	0.0059
353390	25	RIM	Main Population	PB	42.6	±2.7	0.042	±0.009	0.0066	±0.0004	0.048	±0.011	0.0066
353390	26	RIM	Inherited	PB	48.4	±4.2	0.051	±0.018	0.0076	±0.0007	0.052	±0.020	0.0075
353390	27	RIM	Lead Loss	PB	40.4	±2.8	0.060	±0.016	0.0065	±0.0004	0.068	±0.019	0.0063
353390	28	RIM	Main Population	PB	42.8	±2.0	0.046	±0.007	0.0067	±0.0003	0.051	±0.008	0.0067
353390	29	RIM	Discordant	PB	42.9	±2.0	0.056	±0.008	0.0068	±0.0003	0.059	±0.009	0.0067
353390	30	RIM	Main Population	PB	43.1	±1.9	0.040	±0.006	0.0067	±0.0003	0.044	±0.007	0.0067
353390	31	RIM	Main Population	PB	45.3	±3.1	0.044	±0.011	0.0071	±0.0005	0.045	±0.012	0.0071
353390	32	RIM	Main Population	PB	46.3	±3.6	0.045	±0.015	0.0072	±0.0006	0.048	±0.017	0.0072
353390	33	CORE	Main Population	PB	42.7	±3.1	0.052	±0.013	0.0067	±0.0005	0.056	±0.014	0.0067
353390	33	MID	Main Population	PB	45.2	±3.3	0.049	±0.015	0.0071	±0.0005	0.048	±0.016	0.0070
353390	33	RIM	Main Population	PB	41.0	±2.0	0.042	±0.005	0.0064	±0.0003	0.049	±0.007	0.0064
353390	34	RIM	Main Population	PB	41.4	±2.2	0.042	±0.007	0.0065	±0.0003	0.047	±0.007	0.0065
353390	35	RIM	Main Population	PB	42.8	±2.3	0.042	±0.007	0.0067	±0.0004	0.047	±0.008	0.0067
353390	36	RIM	Discordant	PB	44.2	±2.2	0.057	±0.008	0.0070	±0.0003	0.059	±0.008	0.0069
353390	37	RIM	Main Population	PB	44.7	±2.9	0.045	±0.012	0.0070	±0.0005	0.048	±0.012	0.0070
353390	38	RIM	Lead Loss	PB	40.3	±2.1	0.047	±0.008	0.0063	±0.0003	0.055	±0.010	0.0063

Table A1. 1 continued: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.Table A1. 1: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Area of analysis	Observation	Area	Age $^{206}Pb/^{238}U$ ^{207}Pb corrected (Ma)		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{206}Pb/^{207}Pb$		$^{206}Pb/^{238}U$ ^{207}Pb corrected
353390	39	RIM	Main Population	PB	42.5	±3.0	0.044	±0.015	0.0066	±0.0005	0.048	±0.016	0.0066
353390	40	CORE	Inherited	PB	46.8	±3.6	0.058	±0.016	0.0074	±0.0006	0.062	±0.018	0.0073
353390	40	RIM	Main Population	PB	45.4	±3.0	0.040	±0.010	0.0071	±0.0005	0.038	±0.011	0.0071
353390	41	RIM	Lead Loss	PB	40.3	±3.2	0.117	±0.028	0.0070	±0.0005	0.127	±0.031	0.0063
353390	42	RIM	Discordant	PB	43.0	±2.3	0.054	±0.010	0.0068	±0.0004	0.060	±0.012	0.0067
353390	43	RIM	Main Population	PB	45.2	±3.2	0.050	±0.016	0.0071	±0.0005	0.058	±0.020	0.0070
353390	44	RIM	Inherited	PB	50.6	±2.8	0.046	±0.008	0.0079	±0.0004	0.044	±0.008	0.0079
353390	44	CORE	Inherited	PB	61.2	±3.5	0.057	±0.011	0.0095	±0.0006	0.046	±0.010	0.0095
353390	45	RIM	Inherited	PB	46.9	±2.3	0.048	±0.007	0.0073	±0.0004	0.047	±0.007	0.0073
353390	46	RIM	Main Population	PB	45.2	±2.7	0.039	±0.008	0.0070	±0.0004	0.043	±0.009	0.0070
353390	47	RIM	Main Population	PB	43.8	±2.7	0.053	±0.011	0.0070	±0.0004	0.065	±0.015	0.0068
353390	48	RIM	Discordant	PB	46.1	±2.4	0.038	±0.007	0.0072	±0.0004	0.040	±0.007	0.0072
353390	48	CORE	Main Population	PB	43.8	±2.7	0.051	±0.015	0.0069	±0.0004	0.059	±0.018	0.0068
353393	1	RIM	Main Population	TYC	38.0	±1.5	0.041	±0.006	0.0059	±0.0002	0.051	±0.007	0.0059
353393	2	RIM	Main Population	TYC	38.5	±3.6	0.043	±0.021	0.0061	±0.0006	0.055	±0.028	0.0060
353393	3	RIM	Discordant	TYC	37.9	±2.5	0.052	±0.013	0.0060	±0.0004	0.065	±0.016	0.0059
353393	4	RIM	Discordant	TYC	39.3	±1.7	0.052	±0.009	0.0062	±0.0003	0.062	±0.012	0.0061
353393	5	RIM	Main Population	TYC	36.8	±1.3	0.036	±0.005	0.0057	±0.0002	0.047	±0.006	0.0057
353393	6	CORE	Inherited	TYC	44.4	±2.3	0.054	±0.011	0.0070	±0.0004	0.055	±0.011	0.0069
353393	6	RIM	Main Population	TYC	38.7	±1.6	0.037	±0.005	0.0060	±0.0002	0.047	±0.007	0.0060
353393	7	RIM	Discordant	TYC	36.6	±1.8	0.063	±0.009	0.0059	±0.0003	0.078	±0.012	0.0057
353393	8	CORE	Main Population	TYC	37.7	±2.0	0.037	±0.008	0.0059	±0.0003	0.048	±0.011	0.0059
353393	8	RIM	Discordant	TYC	36.8	±2.2	0.068	±0.014	0.0060	±0.0004	0.083	±0.016	0.0057
353393	9	RIM	Lead Loss	TYC	33.9	±1.8	0.032	±0.010	0.0053	±0.0003	0.039	±0.012	0.0053
353393	10	RIM	Main Population	TYC	37.6	±1.5	0.046	±0.007	0.0059	±0.0002	0.057	±0.009	0.0059
353393	11	RIM	Inherited	TYC	59.7	±3.2	0.062	±0.016	0.0093	±0.0005	0.048	±0.013	0.0093

Table A1. 1 continued: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.Table A1. 1: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Area of analysis	Observation	Area	Age $^{206}Pb/^{238}U$ ^{207}Pb corrected (Ma)		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{206}Pb/^{207}Pb$		$^{206}Pb/^{238}U$ ^{207}Pb corrected
353393	12	RIM	Discordant	TYC	38.1	±1.8	0.059	±0.011	0.0061	±0.0003	0.071	±0.015	0.0059
353393	13	RIM	Main Population	TYC	38.7	±1.7	0.036	±0.007	0.0060	±0.0003	0.043	±0.009	0.0060
353393	14	RIM	Main Population	TYC	36.5	±1.8	0.036	±0.007	0.0057	±0.0003	0.047	±0.009	0.0057
353393	15	RIM	Inherited	TYC	40.2	±2.7	0.038	±0.010	0.0063	±0.0004	0.045	±0.011	0.0063
353393	16	RIM	Main Population	TYC	39.0	±1.6	0.041	±0.007	0.0061	±0.0003	0.048	±0.008	0.0061
353393	17	RIM	Lead Loss	TYC	35.5	±4.5	0.049	±0.028	0.0058	±0.0007	0.085	±0.056	0.0055
353393	17	CORE	Lead Loss	TYC	34.7	±3.8	0.057	±0.024	0.0058	±0.0006	0.100	±0.045	0.0054
353393	18	RIM	Inherited	TYC	41.4	±6.1	0.052	±0.041	0.0066	±0.0010	0.067	±0.053	0.0064
353393	19	RIM	Main Population	TYC	39.3	±3.3	0.032	±0.013	0.0061	±0.0005	0.042	±0.017	0.0061
353393	20	RIM	Main Population	TYC	38.8	±2.0	0.044	±0.007	0.0061	±0.0003	0.057	±0.010	0.0060
353393	21	RIM	Main Population	TYC	37.9	±1.5	0.037	±0.005	0.0059	±0.0002	0.047	±0.006	0.0059
353393	22	RIM	Discordant	TYC	37.6	±2.1	0.051	±0.012	0.0060	±0.0003	0.063	±0.015	0.0059
353393	23	RIM	Main Population	TYC	38.7	±1.7	0.036	±0.007	0.0060	±0.0003	0.045	±0.008	0.0060
353393	24	RIM	Main Population	TYC	37.6	±1.3	0.040	±0.005	0.0059	±0.0002	0.049	±0.007	0.0058
353393	25	RIM	Inherited	TYC	65.4	±5.0	0.094	±0.043	0.0105	±0.0008	0.072	±0.032	0.0102
353393	26	RIM	Main Population	TYC	38.6	±3.2	0.048	±0.021	0.0061	±0.0005	0.053	±0.025	0.0060
353393	27	RIM	Main Population	TYC	38.9	±2.2	0.042	±0.011	0.0061	±0.0004	0.054	±0.015	0.0061
353393	28	RIM	Main Population	TYC	37.9	±2.8	0.046	±0.013	0.0060	±0.0004	0.060	±0.019	0.0059
353393	29	RIM	Main Population	TYC	37.4	±4.5	0.036	±0.015	0.0059	±0.0007	0.053	±0.024	0.0058
353393	30	RIM	Inherited	TYC	205.3	±11.0	0.234	±0.042	0.0325	±0.0017	0.054	±0.010	0.0324
353393	31	RIM	Main Population	TYC	36.7	±1.6	0.042	±0.006	0.0058	±0.0003	0.053	±0.008	0.0057
353393	31	CORE	Discordant	TYC	39.5	±2.3	0.056	±0.013	0.0063	±0.0004	0.064	±0.016	0.0062
353393	32	RIM	Inherited	TYC	42.4	±2.2	0.046	±0.011	0.0066	±0.0003	0.050	±0.012	0.0066
353393	33	CORE	Main Population	TYC	38.5	±2.3	0.044	±0.011	0.0060	±0.0004	0.053	±0.014	0.0060
353393	33	RIM	Main Population	TYC	38.6	±1.9	0.041	±0.007	0.0060	±0.0003	0.049	±0.009	0.0060
353393	34	RIM	Discordant	TYC	36.6	±2.5	0.062	±0.016	0.0059	±0.0004	0.074	±0.019	0.0057

Table A1. 1 continued: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.Table A1. 1: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Area of analysis	Observation	Area	Age $^{206}Pb/^{238}U$ ^{207}Pb corrected (Ma)		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{206}Pb/^{207}Pb$		$^{206}Pb/^{238}U$ ^{207}Pb corrected
353393	35	RIM	Inherited	TYC	41.8	±4.7	0.040	±0.016	0.0065	±0.0007	0.047	±0.019	0.0065
353393	36	RIM	Main Population	TYC	37.7	±1.6	0.042	±0.007	0.0059	±0.0003	0.052	±0.010	0.0059
353393	37	RIM	Main Population	TYC	37.0	±2.0	0.044	±0.009	0.0058	±0.0003	0.056	±0.012	0.0058
353393	38	RIM	Inherited	TYC	40.8	±2.8	0.043	±0.015	0.0064	±0.0004	0.054	±0.019	0.0064
353393	39	RIM	Main Population	TYC	38.7	±2.1	0.045	±0.018	0.0061	±0.0003	0.059	±0.025	0.0060
353393	40	RIM	Main Population	TYC	38.5	±1.8	0.038	±0.007	0.0060	±0.0003	0.048	±0.009	0.0060
353393	41	CORE	Main Population	TYC	39.9	±2.1	0.043	±0.009	0.0062	±0.0003	0.049	±0.011	0.0062
353393	41	RIM	Main Population	TYC	37.4	±1.9	0.041	±0.011	0.0058	±0.0003	0.048	±0.013	0.0058
353393	42	RIM	Main Population	TYC	39.1	±1.6	0.038	±0.006	0.0061	±0.0003	0.047	±0.008	0.0061
353393	42	CORE	Inherited	TYC	59.2	±4.2	0.052	±0.015	0.0092	±0.0007	0.045	±0.014	0.0092
353393	43	RIM	Inherited	TYC	41.0	±2.5	0.042	±0.010	0.0064	±0.0004	0.049	±0.013	0.0064
353393	44	RIM	Inherited	TYC	40.5	±1.4	0.037	±0.006	0.0063	±0.0002	0.043	±0.007	0.0063
353393	45	RIM	Main Population	TYC	39.8	±2.2	0.050	±0.013	0.0063	±0.0003	0.060	±0.017	0.0062
353393	46	RIM	Inherited	TYC	40.5	±1.6	0.041	±0.008	0.0063	±0.0003	0.047	±0.009	0.0063
353393	46	CORE	Inherited	TYC	40.5	±1.6	0.037	±0.007	0.0063	±0.0003	0.044	±0.008	0.0063
353393	47	RIM	Inherited	TYC	40.5	±2.3	0.042	±0.008	0.0063	±0.0004	0.050	±0.010	0.0063
353393	47	CORE	Lead Loss	TYC	35.9	±2.2	0.039	±0.009	0.0056	±0.0004	0.050	±0.013	0.0056
353393	48	CORE	Inherited	TYC	41.6	±2.3	0.039	±0.010	0.0065	±0.0004	0.043	±0.010	0.0065
353393	48	RIM	Main Population	TYC	38.9	±1.5	0.041	±0.006	0.0061	±0.0002	0.049	±0.008	0.0061
353393	48	CORE	Main Population	TYC	39.2	±2.1	0.037	±0.009	0.0061	±0.0003	0.044	±0.012	0.0061
353393	49	RIM	Discordant	TYC	37.5	±2.9	0.058	±0.020	0.0060	±0.0005	0.065	±0.021	0.0058
353393	49	CORE	Discordant	TYC	37.2	±1.7	0.055	±0.011	0.0059	±0.0003	0.066	±0.013	0.0058
353393	50	RIM	Lead Loss	TYC	35.3	±3.3	0.046	±0.019	0.0056	±0.0005	0.056	±0.019	0.0055
353393	50	CORE	Lead Loss	TYC	36.3	±4.3	0.039	±0.025	0.0058	±0.0007	0.064	±0.040	0.0056
353393	51	RIM	Inherited	TYC	40.1	±2.3	0.041	±0.011	0.0063	±0.0004	0.051	±0.016	0.0062
353393	51	CORE	Main Population	TYC	39.5	±2.2	0.045	±0.010	0.0062	±0.0004	0.053	±0.012	0.0062

Table A1. 1 continued: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.Table A1. 1: Zircon U-Pb data. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Area of analysis	Observation	Area	Age $^{206}Pb/^{238}U$ ^{207}Pb corrected (Ma)		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{206}Pb/^{207}Pb$		$^{206}Pb/^{238}U$ ^{207}Pb corrected
353393	51	MID	Inherited	TYC	40.1	±1.8	0.045	±0.007	0.0063	±0.0003	0.051	±0.008	0.0062
353393	52	MID	Main Population	TYC	39.3	±1.7	0.035	±0.007	0.0061	±0.0003	0.043	±0.009	0.0061
353393	52	CORE	Inherited	TYC	40.8	±2.6	0.039	±0.012	0.0064	±0.0004	0.045	±0.014	0.0064
353393	52	RIM	Discordant	TYC	38.2	±1.6	0.032	±0.005	0.0060	±0.0003	0.042	±0.008	0.0060
353393	53	RIM	Inherited	TYC	173.3	±6.2	0.184	±0.022	0.0272	±0.0010	0.047	±0.006	0.0272
353393	54	RIM	Discordant	TYC	37.0	±3.5	0.098	±0.029	0.0063	±0.0006	0.119	±0.034	0.0058

Table A1. 2: Zircon geochemistry for P, Ti, Y, Zr and La. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	31 P		49 Ti		89 Y		91 Zr		139 La	
353353	1	RIM	Lead Loss	PB	178	±6	9.9	±0.8	295	±6	415000	±12000	b.l.d.	
353353	2	RIM	Lead Loss	PB	219	±6	9.4	±0.7	837	±15	416000	±12000	b.l.d.	
353353	3	RIM	Lead Loss	PB	99	±21	2.3	±0.7	395	±99	196000	±48000	0.0204	±0.005
353353	4	RIM	Lead Loss	PB	184	±13	7.8	±1.3	360	±31	416000	±10000	0.0420	±0.010
353353	5	RIM	Lead Loss	PB	233	±9	6.6	±0.8	913	±18	435000	±11000	0.0740	±0.015
353353	6	RIM	Main Population	PB	161	±6	7.9	±0.8	438	±15	415000	±13000	b.l.d.	
353353	7	RIM	Main Population	PB	148	±7	5.2	±0.8	515	±26	417000	±12000	0.0620	±0.019
353353	8	RIM	Main Population	PB	290	±10	13.3	±1.1	1368	±46	390300	±6400	0.0451	±0.008
353353	9	RIM	Main Population	PB	279	±14	11.3	±2.0	769	±15	512000	±13000	b.l.d.	
353353	10	RIM	Discordant	PB	208	±11	4.0	±0.8	1197	±22	455000	±11000	0.0210	±0.013
353353	11	RIM	Main Population	PB	267	±9	13.6	±1.1	514	±16	447000	±14000	b.l.d.	
353353	12	RIM	Main Population	PB	200	±7	8.7	±0.7	432	±16	417000	±12000	b.l.d.	
353353	13	RIM	Main Population	PB	255	±10	11.8	±1.2	972	±25	418000	±13000	0.0153	±0.006
353353	14	RIM	Main Population	PB	268	±8	14.1	±0.9	770	±16	417000	±12000	0.0170	±0.004
353353	15	RIM	Lead Loss	PB	315	±25	8.3	±1.0	740	±110	406200	±3300	0.0173	±0.008
353353	16	RIM	Main Population	PB	206	±7	5.8	±0.7	503	±11	421000	±12000	b.l.d.	
353353	17	RIM	Lead Loss	PB	181	±12	7.5	±1.2	532	±16	488000	±16000	0.0038	±0.004
353353	18	RIM	Main Population	PB	257	±12	9.6	±0.8	990	±68	412000	±11000	0.0118	±0.004
353353	19	RIM	Discordant	PB	191	±15	7.4	±2.0	754	±18	516900	±9700	0.0340	±0.015
353353	20	RIM	Main Population	PB	224	±10	8.2	±1.0	1007	±32	458000	±16000	0.0350	±0.014
353353	21	RIM	Main Population	PB	190	±11	8.9	±0.8	615	±92	417000	±13000	0.0075	±0.004
353353	22	RIM	Main Population	PB	227	±7	11.3	±0.9	749	±46	426000	±12000	0.0077	±0.004
353353	23	RIM	Lead Loss	PB	216	±6	12.2	±0.9	406	±9	429000	±14000	0.0128	±0.004
353353	24	RIM	Main Population	PB	192	±7	10.0	±0.8	411	±12	426000	±13000	b.l.d.	
353353	25	RIM	Main Population	PB	230	±9	9.5	±0.7	1066	±33	444000	±14000	b.l.d.	
353353	26	RIM	Lead Loss	PB	210	±11	5.7	±1.4	998	±50	482000	±12000	0.0154	±0.008
353353	27	RIM	Main Population	PB	168	±15	2.3	±1.2	751	±31	361300	±7800	0.0152	±0.008
353353	28	RIM	Lead Loss	PB	137	±45	6.8	±2.5	370	±120	246000	±84000	0.0260	±0.011
353353	29	RIM	Discordant	PB	223	±6	10.7	±1.0	470	±12	413000	±12000	0.0092	±0.004
353353	30	RIM	Lead Loss	PB	134	±6	4.7	±0.8	432	±9	421000	±13000	0.0081	±0.006
353353	31	RIM	Main Population	PB	229	±9	12.0	±1.1	513	±22	425000	±13000	b.l.d.	

Table A1. 2 continued: Zircon geochemistry for P, Ti, Y, Zr and La. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	31 P		49 Ti		89 Y		91 Zr		139 La	
353353	32	RIM	Lead Loss	PB	171	±8	4.4	±0.9	454	±18	379900	±6700	0.0092	±0.005
353353	33	RIM	Main Population	PB	246	±25	13.7	±0.9	838	±74	418000	±13000	0.0157	±0.007
353353	34	RIM	Main Population	PB	246	±7	8.7	±0.8	532	±15	418000	±13000	b.l.d.	
353353	35	RIM	Discordant	PB	239	±6	11.4	±1.1	753	±22	420000	±12000	b.l.d.	
353353	36	RIM	Lead Loss	PB	281	±10	7.4	±0.8	979	±51	445000	±12000	0.0560	±0.010
353353	37	RIM	Inherited	PB	189	±9	3.5	±0.6	568	±19	414000	±12000	0.0940	±0.019
353353	38	RIM	Lead Loss	PB	189	±8	5.2	±1.0	863	±33	472400	±9800	0.0109	±0.005
353353	39	RIM	Main Population	PB	232	±9	9.1	±1.0	593	±33	415000	±11000	0.0105	±0.005
353353	40	RIM	Lead Loss	PB	229	±7	10.7	±0.9	923	±27	421000	±11000	0.0096	±0.004
353353	41	RIM	Discordant	PB	190	±8	6.6	±1.0	578	±13	441800	±9200	0.0188	±0.007
353353	42	RIM	Main Population	PB	249	±9	8.7	±1.0	940	±16	428000	±13000	b.l.d.	
353353	43	RIM	Main Population	PB	191	±12	9.4	±1.9	532	±14	472000	±15000	0.0410	±0.016
353353	44	RIM	Titanite/Apatite Inclusions	PB	410	±55	11.5	±5.8	814	±60	384000	±27000	1.3000	±0.280
353353	45	RIM	Discordant	PB	58	±17	1.9	±0.9	305	±88	198000	±61000	0.0480	±0.023
353353	46	RIM	Discordant	PB	210	±7	10.6	±0.9	416	±12	414000	±12000	0.0265	±0.007
353353	47	RIM	Main Population	PB	363	±25	12.4	±1.2	471	±18	364200	±4400	0.2140	±0.034
353353	48	RIM	Main Population	PB	228	±12	6.4	±1.0	426	±6	369900	±5300	0.0230	±0.011
353353	49	RIM	Main Population	PB	198	±6	9.1	±0.8	372	±10	413000	±11000	b.l.d.	
353355	1	RIM	Main Population	PB	200	±9	7.9	±1.2	505	±11	443000	±12000	b.l.d.	
353355	2	RIM	Main Population	PB	191	±8	9.6	±1.0	469	±16	437000	±13000	b.l.d.	
353355	3	RIM	Main Population	PB	217	±22	11.4	±1.4	1020	±100	373000	±38000	0.0300	±0.008
353355	4	RIM	Lead Loss	PB	219	±7	10.7	±0.9	463	±16	419000	±11000	b.l.d.	
353355	5	RIM	Discordant	PB	244	±7	9.5	±0.9	559	±12	415000	±11000	b.l.d.	
353355	6	RIM	Discordant	PB	226	±8	11.0	±1.0	983	±36	416000	±12000	0.0049	±0.003
353355	7	RIM	Main Population	PB	288	±8	8.7	±0.8	486	±16	422000	±11000	b.l.d.	
353355	8	RIM	Main Population	PB	112	±32	7.5	±2.4	319	±95	245000	±73000	0.0194	±0.008
353355	9	RIM	Inherited	PB	216	±6	12.1	±1.0	908	±30	424000	±11000	0.0044	±0.002
353355	10	RIM	Main Population	PB	228	±10	10.8	±1.4	908	±53	459000	±16000	b.l.d.	
353355	10	CORE	Main Population	PB	107	±13	3.1	±0.8	421	±95	452000	±11000	0.0205	±0.009
353355	11	RIM	Main Population	PB	228	±7	9.9	±0.9	813	±23	423000	±11000	b.l.d.	
353355	12	RIM	Main Population	PB	248	±10	11.7	±1.1	1223	±48	443000	±14000	0.0088	±0.005

Table A1. 2 continued: Zircon geochemistry for P, Ti, Y, Zr and La. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	31 P		49 Ti		89 Y		91 Zr		139 La	
353355	13	RIM	Main Population	PB	214	±11	10.0	±1.2	870	±54	428000	±12000	b.l.d.	
353355	14	CORE	Main Population	PB	241	±8	12.2	±1.1	502	±11	442000	±12000	b.l.d.	
353355	14	MID	Main Population	PB	207	±7	11.2	±0.8	463	±10	425700	±9800	b.l.d.	
353355	14	MID	Lead Loss	PB	204	±7	11.2	±0.8	393	±13	415000	±9000	b.l.d.	
353355	14	RIM	Discordant	PB	197	±6	9.0	±0.9	411	±17	421000	±11000	b.l.d.	
353355	15	RIM	Main Population	PB	199	±13	7.1	±1.5	1087	±65	436000	±17000	0.0100	±0.006
353355	16	RIM	Main Population	PB	203	±7	8.2	±0.8	469	±10	415000	±12000	b.l.d.	
353355	17	RIM	Main Population	PB	278	±8	12.3	±1.0	558	±19	422000	±11000	b.l.d.	
353355	18	RIM	Main Population	PB	157	±8	6.0	±0.7	325	±18	418000	±12000	0.0192	±0.008
353355	19	RIM	Lead Loss	PB	214	±8	12.7	±1.0	315	±5	412000	±10000	b.l.d.	
353355	20	RIM	Main Population	PB	220	±6	9.7	±0.9	671	±20	424000	±12000	0.0046	±0.003
353355	21	CORE	Inherited	PB	229	±9	12.5	±1.0	932	±51	416000	±11000	0.0067	±0.003
353355	21	RIM	Inherited	PB	172	±5	8.4	±0.8	544	±14	423000	±11000	b.l.d.	
353355	22	RIM	Main Population	PB	246	±9	11.0	±0.8	818	±22	416000	±13000	b.l.d.	
353355	23	RIM	Inherited	PB	243	±9	14.8	±1.5	1355	±93	448000	±13000	0.0266	±0.007
353355	24	RIM	Main Population	PB	246	±6	8.5	±0.8	1259	±44	427000	±12000	b.l.d.	
353355	25	RIM	Main Population	PB	211	±9	9.7	±1.0	859	±39	455000	±16000	b.l.d.	
353355	26	RIM	Inherited	PB	146	±8	3.7	±1.3	365	±14	372900	±4200	0.0260	±0.010
353355	27	RIM	Main Population	PB	256	±12	5.0	±0.7	762	±36	415000	±12000	0.0091	±0.005
353355	28	RIM	Main Population	PB	269	±10	8.4	±1.0	628	±23	412000	±13000	0.0158	±0.006
353355	29	RIM	Main Population	PB	174	±7	7.7	±0.8	397	±6	423000	±13000	0.0110	±0.006
353355	30	RIM	Main Population	PB	215	±6	8.9	±1.0	477	±9	412000	±11000	b.l.d.	
353355	31	RIM	Discordant	PB	239	±19	10.0	±2.4	573	±8	449900	±8900	0.2110	±0.085
353355	32	RIM	Main Population	PB	182	±11	8.7	±1.4	511	±11	511000	±13000	b.l.d.	
353355	33	RIM	Inherited	PB	128	±7	5.0	±0.6	277	±6	446000	±13000	b.l.d.	
353355	34	RIM	Main Population	PB	219	±20	5.2	±0.9	980	±150	418000	±13000	0.0500	±0.018
353355	35	RIM	Main Population	PB	208	±6	8.9	±0.8	448	±10	415000	±10000	0.0057	±0.003
353355	36	CORE	Main Population	PB	260	±9	16.2	±1.0	897	±55	457000	±13000	0.0127	±0.005
353355	36	RIM	Main Population	PB	194	±6	6.5	±0.7	464	±12	423000	±11000	b.l.d.	
353355	37	RIM	Discordant	PB	277	±17	12.8	±2.0	1218	±43	522000	±14000	0.1050	±0.045
353355	38	RIM	Main Population	PB	239	±7	11.7	±0.8	512	±15	426000	±12000	0.0057	±0.003

Table A1. 2 continued: Zircon geochemistry for P, Ti, Y, Zr and La. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	31 P		49 Ti		89 Y		91 Zr		139 La	
353355	39	RIM	Main Population	PB	216	±7	7.7	±0.7	533	±15	425000	±13000	b.l.d.	
353355	40	RIM	Main Population	PB	195	±7	9.0	±0.9	434	±8	422000	±11000	b.l.d.	
353355	41	RIM	Main Population	PB	206	±7	9.0	±0.9	791	±24	409000	±11000	0.0134	±0.005
353355	42	RIM	Discordant	PB	299	±20	11.1	±2.9	540	±33	370400	±3400	0.1620	±0.071
353355	43	RIM	Discordant	PB	192	±6	9.2	±0.8	502	±19	422000	±11000	0.0095	±0.004
353355	44	CORE	Main Population	PB	192	±8	10.5	±0.9	765	±21	414000	±10000	b.l.d.	
353355	44	RIM	Main Population	PB	217	±6	10.5	±0.7	466	±14	422000	±11000	b.l.d.	
353355	45	RIM	Main Population	PB	196	±7	5.6	±0.7	471	±5	419000	±12000	b.l.d.	
353355	46	RIM	Main Population	PB	233	±7	10.2	±0.8	508	±14	429000	±13000	b.l.d.	
353355	47	RIM	Main Population	PB	192	±10	10.3	±1.1	494	±25	455000	±16000	0.0127	±0.005
353355	48	RIM	Main Population	PB	202	±9	8.0	±0.9	675	±36	458000	±14000	b.l.d.	
353355	49	RIM	Main Population	PB	201	±11	9.1	±1.0	565	±22	442000	±17000	0.0079	±0.005
353355	50	RIM	Main Population	PB	357	±15	8.5	±1.6	1028	±62	448000	±13000	0.0234	±0.009
353358	1	RIM	Main Population	PB	199	±9	7.2	±1.0	1000	±85	436000	±16000	0.0153	±0.006
353358	2	RIM	Main Population	PB	270	±9	12.4	±1.0	1353	±76	413000	±12000	0.0172	±0.004
353358	3	RIM	Main Population	PB	311	±12	9.3	±1.1	856	±30	392300	±6400	0.0710	±0.017
353358	4	RIM	Inherited	PB	195	±15	11.0	±2.3	531	±10	508000	±10000	b.l.d.	
353358	5	RIM	Main Population	PB	56	±16	1.7	±0.6	360	±120	141000	±45000	0.0146	±0.005
353358	6	RIM	Main Population	PB	222	±7	10.0	±0.7	492	±8	421000	±11000	b.l.d.	
353358	7	RIM	Inherited	PB	189	±9	7.9	±1.2	835	±40	494000	±11000	0.0260	±0.011
353358	8	RIM	Main Population	PB	216	±11	4.4	±0.7	1069	±31	432000	±12000	0.0280	±0.014
353358	9	RIM	Main Population	PB	186	±37	8.9	±2.1	990	±210	306000	±63000	0.0285	±0.008
353358	10	RIM	Main Population	PB	275	±7	6.4	±0.8	821	±30	415000	±11000	0.0310	±0.011
353358	11	RIM	Discordant	PB	288	±11	8.8	±0.9	1427	±72	421000	±12000	0.0056	±0.003
353358	13	RIM	Main Population	PB	178	±6	3.3	±0.6	847	±25	425000	±10000	0.0360	±0.014
353358	14	RIM	Main Population	PB	227	±7	12.8	±1.0	442	±9	420000	±11000	b.l.d.	
353358	15	RIM	Inherited	PB	78	±18	4.3	±1.1	181	±45	196000	±48000	b.l.d.	
353358	16	RIM	Inherited	PB	212	±6	10.7	±0.7	485	±14	418000	±11000	b.l.d.	
353358	17	RIM	Main Population	PB	210	±6	11.0	±0.8	436	±12	422000	±11000	b.l.d.	
353358	18	RIM	Discordant	PB	210	±7	6.8	±0.6	530	±11	423000	±11000	b.l.d.	
353358	19	RIM	Main Population	PB	217	±6	8.5	±0.7	573	±5	415000	±10000	0.0072	±0.003

Table A1. 2 continued: Zircon geochemistry for P, Ti, Y, Zr and La. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	31 P		49 Ti		89 Y		91 Zr		139 La	
353358	20	RIM	Main Population	PB	170	±49	5.2	±1.5	870	±280	218000	±63000	0.0229	±0.009
353358	21	RIM	Main Population	PB	265	±9	7.7	±0.8	1203	±56	416000	±11000	0.0091	±0.004
353358	22	RIM	Main Population	PB	173	±7	7.5	±0.9	492	±6	448000	±11000	b.l.d.	
353358	23	RIM	Main Population	PB	178	±10	5.3	±0.8	1036	±50	426000	±10000	0.0650	±0.018
353358	24	RIM	Main Population	PB	230	±7	11.3	±0.7	780	±36	427000	±12000	0.0085	±0.003
353358	25	RIM	Main Population	PB	193	±6	9.5	±0.7	378	±15	422000	±11000	b.l.d.	
353358	26	RIM	Main Population	PB	198	±7	5.4	±0.7	1064	±45	414000	±10000	0.0196	±0.005
353358	27	RIM	Main Population	PB	129	±22	6.5	±1.2	308	±52	285000	±48000	b.l.d.	
353358	28	RIM	Main Population	PB	227	±5	10.3	±0.9	458	±17	418000	±11000	b.l.d.	
353358	29	RIM	Main Population	PB	215	±15	3.8	±1.0	911	±23	386300	±8700	0.0640	±0.018
353358	30	RIM	Discordant	PB	195	±9	9.9	±1.1	741	±33	410200	±9900	0.1240	±0.018
353358	31	RIM	Main Population	PB	211	±10	7.9	±1.2	935	±57	490000	±11000	0.0083	±0.006
353358	32	RIM	Main Population	PB	200	±7	9.2	±0.7	530	±16	436000	±11000	0.0040	±0.003
353358	33	RIM	Main Population	PB	237	±17	8.0	±1.3	1333	±65	465000	±12000	0.3050	±0.097
353358	34	RIM	Titanite/Apatite Inclusions	PB	417	±20	3.8	±0.6	830	±20	427000	±8800	2.2700	±0.250
353358	35	RIM	Main Population	PB	230	±9	5.1	±0.7	1053	±54	436000	±12000	0.0078	±0.004
353358	36	CORE	Main Population	PB	276	±9	12.2	±0.8	722	±46	422000	±10000	b.l.d.	
353358	36	MID	Main Population	PB	228	±6	11.2	±0.8	506	±24	421000	±11000	b.l.d.	
353358	36	RIM	Inherited	PB	181	±5	6.8	±0.6	367	±20	420000	±12000	b.l.d.	
353358	37	RIM	Main Population	PB	202	±6	8.3	±0.8	514	±10	415000	±11000	b.l.d.	
353358	38	RIM	Main Population	PB	85	±20	2.8	±0.8	500	±130	260000	±62000	0.0040	±0.002
353358	39	RIM	Inherited	PB	221	±6	10.3	±0.8	487	±13	427000	±12000	b.l.d.	
353358	40	RIM	Inherited	PB	200	±5	8.8	±0.8	503	±11	417000	±10000	b.l.d.	
353358	41	RIM	Main Population	PB	276	±7	12.1	±0.9	1491	±74	419000	±11000	0.0155	±0.004
353358	42	RIM	Main Population	PB	158	±7	4.3	±0.6	473	±18	424000	±12000	b.l.d.	
353358	43	RIM	Main Population	PB	144	±7	4.9	±1.0	526	±8	484000	±10000	b.l.d.	
353358	44	RIM	Main Population	PB	191	±10	7.2	±0.7	714	±70	413000	±11000	0.0320	±0.015
353358	45	CORE	Main Population	PB	213	±9	10.5	±0.8	667	±39	422000	±12000	0.0032	±0.002
353358	45	RIM	Discordant	PB	180	±6	8.0	±0.8	428	±21	419800	±9900	b.l.d.	
353358	46	RIM	Lead Loss	PB	255	±32	6.5	±5.4	1157	±27	369000	±11000	0.0480	±0.044
353358	47	CORE	Lead Loss	PB	166	±9	15.9	±1.6	247	±4	370800	±4900	0.3190	±0.039

Table A1. 2 continued: Zircon geochemistry for P, Ti, Y, Zr and La. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	31 P		49 Ti		89 Y		91 Zr		139 La	
353358	47	RIM	Inherited	PB	182	±6	7.3	±0.8	331	±13	415000	±10000	b.l.d.	
353358	48	RIM	Main Population	PB	213	±6	10.2	±0.8	499	±20	420800	±9600	b.l.d.	
353358	49	RIM	Main Population	PB	235	±20	3.8	±1.0	1223	±29	505000	±14000	0.4000	±0.140
353362	1	RIM	Inherited	PS	193	±10	6.4	±0.9	464	±12	416000	±13000	0.0146	±0.006
353362	2	RIM	Main Population	PS	179	±24	9.1	±2.6	521	±56	513000	±13000	0.0950	±0.050
353362	3	RIM	Main Population	PS	226	±11	4.4	±0.8	629	±32	428000	±14000	b.l.d.	
353362	4	RIM	Rejected	PS	179	±10	5.8	±1.5	459	±9	494600	±9500	0.1750	±0.057
353362	5	RIM	Main Population	PS	158	±9	3.7	±0.7	739	±33	411000	±13000	0.0105	±0.006
353362	6	RIM	Main Population	PS	182	±7	5.0	±0.8	478	±19	428000	±14000	b.l.d.	
353362	6	CORE	Lead Loss	PS	193	±14	7.3	±1.4	866	±20	431000	±8900	0.0210	±0.010
353362	7	RIM	Inherited	PS	205	±11	6.9	±1.0	507	±32	420000	±13000	0.0880	±0.014
353362	8	RIM	Main Population	PS	114	±9	4.8	±1.0	268	±43	447000	±15000	0.0050	±0.005
353362	9	RIM	Main Population	PS	121	±6	1.9	±0.6	663	±28	410000	±12000	b.l.d.	
353362	10	RIM	Main Population	PS	178	±13	7.9	±1.4	821	±33	500000	±12000	0.0420	±0.013
353362	11	RIM	Inherited	PS	147	±8	4.5	±0.7	386	±21	421000	±13000	b.l.d.	
353362	12	CORE	Inherited	PS	149	±29	9.1	±2.1	850	±160	331000	±63000	0.0070	±0.004
353362	12	RIM	Inherited	PS	201	±9	7.9	±1.0	379	±20	429000	±14000	b.l.d.	
353362	13	RIM	Inherited	PS	219	±10	10.9	±0.9	996	±35	453000	±17000	0.0182	±0.007
353362	14	RIM	Inherited	PS	139	±7	2.9	±0.7	490	±32	415000	±12000	b.l.d.	
353362	15	RIM	Main Population	PS	197	±9	7.0	±1.1	695	±38	449000	±15000	b.l.d.	
353362	16	RIM	Main Population	PS	133	±8	5.1	±1.1	375	±12	442000	±13000	0.0350	±0.011
353362	17	RIM	Main Population	PS	124	±8	4.5	±1.1	366	±17	506000	±15000	b.l.d.	
353362	18	RIM	Main Population	PS	291	±19	21.7	±2.5	802	±15	517000	±19000	0.0390	±0.014
353362	19	RIM	Main Population	PS	182	±10	4.3	±0.9	653	±16	476000	±16000	0.0202	±0.008
353362	20	CORE	Inherited	PS	194	±6	4.8	±0.7	457	±14	416600	±12000	0.0790	±0.011
353362	20	RIM	Main Population	PS	138	±10	4.2	±0.9	399	±16	415000	±9300	0.0950	±0.014
353362	21	RIM	Main Population	PS	225	±26	6.2	±1.8	584	±45	488000	±12000	0.0810	±0.054
353362	22	CORE	Main Population	PS	173	±11	3.7	±1.6	475	±12	458000	±11000	0.0049	±0.012
353362	22	RIM	Lead Loss	PS	86	±12	6.4	±0.8	378	±25	490000	±13000	0.0290	±0.004
353362	23	CORE	Main Population	PS	216	±11	4.1	±1.1	612	±55	469000	±11000	0.1870	±0.029
353362	23	RIM	Main Population	PS	153	±14	4.9	±1.5	419	±33	386700	±6100	0.1360	±0.028

Table A1. 2 continued: Zircon geochemistry for P, Ti, Y, Zr and La. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	31 P		49 Ti		89 Y		91 Zr		139 La	
353362	24	RIM	Main Population	PS	321	±16	7.5	±1.3	1836	±77	479300	±7200	0.8900	±0.110
353362	25	RIM	Main Population	PS	131	±12	3.7	±0.8	408	±26	463000	±13000	0.0101	±0.006
353362	26	RIM	Main Population	PS	226	±18	25.8	±9.8	742	±28	494000	±13000	0.0420	±0.017
353362	27	RIM	Main Population	PS	116	±6	3.7	±0.7	442	±17	416000	±12000	0.0143	±0.005
353362	28	RIM	Main Population	PS	331	±65	6.3	±3.1	950	±110	448000	±31000	0.4900	±0.200
353362	29	RIM	Lead Loss	PS	199	±14	5.6	±1.4	1220	±140	450000	±12000	0.1420	±0.027
353362	30	RIM	Inherited	PS	120	±15	7.5	±2.0	467	±45	496000	±11000	0.0830	±0.035
353362	31	RIM	Lead Loss	PS	243	±28	9.3	±1.7	1050	±120	447000	±20000	0.0600	±0.024
353362	32	RIM	Discordant	PS	222	±7	9.8	±0.8	487	±7	413000	±12000	b.l.d.	
353362	33	RIM	Lead Loss	PS	156	±8	5.7	±0.7	579	±39	444600	±8600	0.0226	±0.006
353362	34	RIM	Inherited	PS	138	±8	3.5	±0.7	300	±19	412000	±12000	0.0079	±0.004
353362	34	CORE	Inherited	PS	231	±47	3.6	±1.0	1200	±290	258000	±48000	0.0390	±0.013
353362	35	CORE	Lead Loss	PS	124	±44	3.2	±1.2	380	±140	214000	±74000	0.0037	±0.003
353362	35	RIM	Main Population	PS	93	±7	2.3	±0.6	495	±56	406000	±11000	b.l.d.	
353362	36	RIM	Main Population	PS	93	±6	3.0	±0.6	283	±3	398700	±8800	0.0752	±0.010
353362	37	RIM	Main Population	PS	100	±8	1.8	±0.6	338	±18	413000	±12000	0.0148	±0.006
353362	38	RIM	Rejected	PS	189	±19	8.6	±5.2	481	±19	516000	±17000	0.0330	±0.018
353362	39	RIM	Discordant	PS	88	±5	1.6	±0.6	315	±5	418000	±12000	b.l.d.	
353362	40	CORE	Discordant	PS	178	±7	4.9	±0.7	425	±10	417000	±11000	0.0430	±0.011
353362	40	RIM	Main Population	PS	93	±5	1.8	±0.6	381	±11	418000	±12000	0.0082	±0.005
353362	41	RIM	Main Population	PS	178	±6	7.0	±0.7	310	±10	420000	±12000	b.l.d.	
353362	41	CORE	Main Population	PS	77	±21	1.8	±0.7	500	±150	203000	±57000	b.l.d.	
353362	42	RIM	Discordant	PS	173	±14	6.5	±1.3	786	±41	475000	±15000	0.0530	±0.023
353362	43	RIM	Main Population	PS	187	±9	8.1	±1.2	576	±28	481000	±10000	b.l.d.	
353362	44	RIM	Main Population	PS	153	±6	5.5	±0.7	332	±5	427000	±12000	0.0079	±0.004
353362	44	CORE	Lead Loss	PS	175	±7	3.9	±0.8	693	±81	370200	±3900	0.0071	±0.005
353362	46	RIM	Main Population	PS	134	±5	4.4	±0.7	293	±4	416000	±12000	b.l.d.	
353362	48	RIM	Main Population	PS	263	±9	10.2	±0.8	840	±42	407000	±11000	b.l.d.	
353362	49	RIM	Main Population	PS	336	±21	10.9	±1.2	550	±16	429000	±17000	0.0183	±0.008
353363	1	CORE	Main Population	PS	140	±8	6.8	±0.7	340	±30	432000	±12000	0.0214	±0.007
353363	1	RIM	Inherited	PS	253	±19	6.5	±1.5	398	±5	356400	±4500	0.0530	±0.027

Table A1. 2 continued: Zircon geochemistry for P, Ti, Y, Zr and La. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	31 P		49 Ti		89 Y		91 Zr		139 La	
353363	2	RIM	Inherited	PS	168	±15	10.2	±0.9	738	±28	497000	±12000	0.1220	±0.028
353363	3	RIM	Main Population	PS	132	±13	4.3	±1.4	316	±10	449000	±17000	0.0840	±0.027
353363	4	RIM	Main Population	PS	206	±10	8.9	±0.8	878	±21	437000	±14000	0.0169	±0.007
353363	5	RIM	Main Population	PS	155	±29	7.6	±4.1	386	±25	447000	±32000	0.1440	±0.071
353363	6	RIM	Discordant	PS	251	±18	14.9	±2.7	1400	±110	487000	±12000	0.0750	±0.022
353363	7	RIM	Inherited	PS	338	±11	19.3	±1.1	2057	±33	415000	±12000	0.0509	±0.009
353363	8	RIM	Main Population	PS	251	±20	3.2	±0.8	850	±76	464000	±15000	0.0960	±0.036
353363	9	RIM	Main Population	PS	190	±10	7.3	±1.5	942	±50	463000	±14000	0.0940	±0.019
353363	10	RIM	Main Population	PS	200	±15	6.2	±1.6	1056	±23	476000	±11000	0.0840	±0.022
353363	11	RIM	Main Population	PS	230	±12	10.5	±4.0	1263	±97	494000	±10000	0.0970	±0.032
353363	12	RIM	Discordant	PS	290	±31	6.1	±1.6	850	±36	485000	±14000	0.0720	±0.036
353363	13	RIM	Main Population	PS	192	±9	6.7	±1.3	777	±20	386400	±7900	0.0730	±0.023
353363	14	RIM	Inherited	PS	59	±15	3.1	±0.9	320	±89	305000	±86000	0.0370	±0.015
353363	15	RIM	Main Population	PS	235	±14	10.3	±1.6	1108	±78	501000	±12000	0.0104	±0.009
353363	16	RIM	Discordant	PS	164	±11	3.9	±1.4	743	±23	497000	±12000	0.0168	±0.010
353363	17	RIM	Titanite/Apatite Inclusions	PS	152	±18	780.0	±200.0	527	±13	488000	±10000	0.1850	±0.047
353363	18	RIM	Discordant	PS	117	±9	4.0	±0.9	544	±31	482000	±13000	0.0450	±0.019
353363	19	RIM	Main Population	PS	184	±11	6.3	±1.5	961	±59	467000	±12000	0.1110	±0.019
353363	20	RIM	Main Population	PS	225	±14	2.8	±0.8	790	±100	472000	±15000	0.0170	±0.010
353363	21	RIM	Main Population	PS	202	±11	3.5	±1.0	732	±20	392200	±7500	0.0520	±0.014
353363	22	CORE	Inherited	PS	195	±11	6.7	±0.7	528	±48	408000	±11000	0.0090	±0.004
353363	22	RIM	Main Population	PS	135	±6	4.2	±0.6	401	±6	412000	±12000	0.0076	±0.003
353363	23	RIM	Main Population	PS	248	±14	2.9	±0.9	888	±63	451000	±12000	0.2700	±0.120
353363	25	RIM	Inherited	PS	181	±6	4.0	±0.6	927	±22	413000	±12000	0.0066	±0.003
353363	26	RIM	Rejected	PS	1020	±200	5.2	±1.2	830	±100	462000	±17000	7.6000	±2.200
353363	27	RIM	Inherited	PS	263	±14	6.7	±1.7	736	±66	416000	±16000	0.0590	±0.025
353363	28	RIM	Main Population	PS	226	±11	4.6	±1.0	1289	±74	472000	±15000	0.0079	±0.004
353363	29	RIM	Discordant	PS	112	±6	4.2	±0.8	231	±4	412000	±11000	0.0426	±0.008
353363	30	RIM	Inherited	PS	234	±9	4.5	±0.7	1211	±48	408000	±12000	0.0760	±0.015
353363	31	RIM	Main Population	PS	223	±13	9.2	±2.2	1310	±200	477000	±14000	0.0295	±0.009
353363	32	RIM	Discordant	PS	157	±9	3.0	±0.7	802	±95	399300	±9100	0.1460	±0.017

Table A1. 2 continued: Zircon geochemistry for P, Ti, Y, Zr and La. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	31 P		49 Ti		89 Y		91 Zr		139 La	
353363	33	RIM	Inherited	PS	1230	±190	4.2	±1.4	4000	±450	502000	±12000	0.0720	±0.039
353363	34	RIM	Main Population	PS	206	±12	8.2	±1.9	938	±30	465000	±11000	0.0590	±0.018
353363	35	RIM	Main Population	PS	152	±9	9.4	±1.3	570	±23	457000	±14000	0.0730	±0.023
353363	36	RIM	Main Population	PS	228	±14	6.2	±1.7	810	±110	485000	±17000	0.0660	±0.041
353363	37	RIM	Main Population	PS	182	±11	6.6	±1.0	546	±41	425000	±14000	0.0330	±0.011
353363	38	RIM	Discordant	PS	160	±6	4.1	±0.7	358	±8	415000	±11000	0.0129	±0.005
353363	39	RIM	Main Population	PS	210	±9	6.8	±1.2	807	±39	459000	±12000	0.0308	±0.008
353363	40	RIM	Titanite/Apatite Inclusions	PS	209	±34	22.0	±6.6	798	±53	477000	±24000	1.5800	±0.850
353363	41	RIM	Main Population	PS	166	±19	5.9	±2.7	740	±110	520400	±8400	0.0350	±0.021
353363	42	RIM	Main Population	PS	252	±10	7.6	±0.8	635	±27	419000	±12000	0.0222	±0.006
353363	43	RIM	Inherited	PS	121	±6	5.6	±0.7	257	±13	429000	±13000	b.l.d.	
353363	44	RIM	Inherited	PS	258	±9	11.1	±1.1	695	±44	412000	±12000	0.0235	±0.005
353363	45	RIM	Inherited	PS	346	±81	10.0	±4.0	695	±31	517000	±20000	0.2280	±0.072
353363	46	RIM	Rejected	PS	278	±48	580.0	±160.0	960	±69	428000	±34000	0.2400	±0.072
353363	47	CORE	Main Population	PS	207	±7	8.8	±0.8	881	±26	412000	±11000	0.0076	±0.003
353363	47	RIM	Main Population	PS	145	±10	4.1	±1.0	462	±14	433000	±11000	0.0230	±0.012
353363	48	RIM	Inherited	PS	248	±11	8.4	±0.8	658	±50	421000	±12000	b.l.d.	
353363	49	RIM	Main Population	PS	210	±8	8.2	±0.9	771	±32	426000	±13000	b.l.d.	
353368	1	RIM	Main Population	PS	135	±5	5.4	±0.6	365	±9	424000	±11000	b.l.d.	
353368	2	RIM	Main Population	PS	198	±6	9.0	±0.9	532	±18	450000	±11000	0.0217	±0.005
353368	3	RIM	Main Population	PS	346	±10	14.2	±1.0	1699	±70	430000	±12000	0.0212	±0.005
353368	4	RIM	Main Population	PS	188	±5	8.5	±0.8	368	±7	423000	±11000	b.l.d.	
353368	5	CORE	Main Population	PS	219	±8	8.1	±0.7	450	±35	421600	±9100	b.l.d.	
353368	5	RIM	Main Population	PS	170	±6	6.9	±0.7	327	±11	421000	±11000	b.l.d.	
353368	6	RIM	Main Population	PS	94	±19	2.3	±0.6	474	±96	235000	±48000	0.0035	±0.003
353368	7	RIM	Inherited	PS	284	±13	6.6	±1.1	1270	±39	512000	±13000	0.0093	±0.007
353368	8	RIM	Main Population	PS	277	±13	9.3	±1.3	904	±17	495800	±9500	0.0180	±0.007
353368	9	RIM	Inherited	PS	168	±7	6.0	±0.8	444	±17	400900	±7800	b.l.d.	
353368	10	RIM	Main Population	PS	138	±5	4.0	±0.5	307	±11	427000	±10000	b.l.d.	
353368	10	CORE	Inherited	PS	160	±11	7.3	±1.3	606	±33	492800	±8100	0.0063	±0.005
353368	11	RIM	Main Population	PS	195	±11	10.6	±0.9	482	±6	487100	±8100	0.0128	±0.006

Table A1. 2 continued: Zircon geochemistry for P, Ti, Y, Zr and La. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	31 P		49 Ti		89 Y		91 Zr		139 La	
353368	12	RIM	Main Population	PS	181	±7	6.0	±0.7	418	±6	417000	±11000	0.0550	±0.017
353368	13	RIM	Inherited	PS	310	±10	9.0	±0.8	1360	±150	419000	±11000	0.0127	±0.004
353368	14	RIM	Main Population	PS	244	±7	10.4	±1.0	630	±15	419000	±11000	0.0023	±0.002
353368	15	RIM	Discordant	PS	195	±7	9.3	±1.0	492	±5	463500	±8500	0.0178	±0.006
353368	16	RIM	Main Population	PS	158	±10	8.5	±1.3	425	±21	490000	±13000	0.0163	±0.008
353368	17	RIM	Main Population	PS	209	±6	9.5	±0.9	361	±7	391100	±7000	b.l.d.	
353368	18	RIM	Main Population	PS	220	±9	9.5	±1.2	812	±35	436000	±15000	0.0053	±0.003
353368	19	RIM	Main Population	PS	161	±44	6.7	±2.0	740	±210	196000	±56000	0.0021	±0.002
353368	20	RIM	Main Population	PS	73	±30	3.0	±1.5	230	±100	220000	±110000	0.0049	±0.003
353368	22	RIM	Discordant	PS	166	±6	5.2	±0.6	500	±26	417000	±11000	0.0204	±0.007
353368	23	RIM	Main Population	PS	161	±17	5.6	±0.8	582	±58	372000	±37000	b.l.d.	
353368	24	RIM	Main Population	PS	243	±8	10.4	±0.8	988	±59	445900	±8100	0.0060	±0.003
353368	25	RIM	Inherited	PS	136	±15	8.8	±1.4	318	±37	375000	±44000	0.0260	±0.012
353368	26	RIM	Main Population	PS	179	±5	8.7	±0.7	310	±10	419000	±10000	b.l.d.	
353368	27	RIM	Main Population	PS	349	±8	10.0	±0.8	2113	±98	422000	±11000	0.0271	±0.005
353368	28	RIM	Main Population	PS	136	±5	5.8	±0.6	335	±5	418000	±10000	b.l.d.	
353368	29	RIM	Lead Loss	PS	278	±10	14.0	±1.2	1480	±88	421400	±8200	0.0880	±0.024
353368	30	RIM	Main Population	PS	77	±25	3.7	±1.4	223	±76	196000	±66000	0.0078	±0.004
353368	31	RIM	Main Population	PS	208	±6	10.1	±0.8	454	±11	430000	±11000	b.l.d.	
353368	32	RIM	Main Population	PS	177	±11	4.2	±0.9	1168	±14	425900	±6200	0.0168	±0.007
353368	33	RIM	Inherited	PS	209	±8	8.0	±0.9	880	±100	420000	±11000	0.0990	±0.030
353368	34	RIM	Main Population	PS	218	±12	9.8	±0.8	940	±100	428100	±9100	0.0168	±0.005
353368	35	RIM	Main Population	PS	135	±5	5.4	±0.7	403	±8	423900	±8100	0.0097	±0.004
353368	36	RIM	Main Population	PS	60	±15	1.5	±0.5	184	±45	185000	±47000	0.0027	±0.002
353368	37	RIM	Main Population	PS	210	±7	9.1	±1.5	385	±9	434000	±11000	b.l.d.	
353368	38	RIM	Inherited	PS	148	±5	3.2	±0.5	461	±22	413000	±11000	b.l.d.	
353368	39	RIM	Inherited	PS	260	±8	4.6	±0.6	718	±42	414000	±11000	0.0098	±0.003
353368	40	RIM	Main Population	PS	131	±5	4.3	±0.7	272	±7	412000	±9400	b.l.d.	
353368	41	RIM	Main Population	PS	210	±9	8.3	±0.9	885	±68	412000	±15000	b.l.d.	
353368	42	RIM	Main Population	PS	138	±6	4.8	±0.6	305	±2	419000	±10000	b.l.d.	
353368	43	RIM	Discordant	PS	263	±10	10.4	±0.9	1541	±83	438000	±12000	0.0208	±0.005

Table A1. 2 continued: Zircon geochemistry for P, Ti, Y, Zr and La. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	31 P		49 Ti		89 Y		91 Zr		139 La	
353368	44	RIM	Main Population	PS	313	±14	13.4	±1.5	1942	±82	495000	±11000	0.0257	±0.008
353368	45	RIM	Main Population	PS	263	±10	10.7	±1.1	814	±50	450000	±11000	b.l.d.	
353368	46	RIM	Main Population	PS	264	±12	12.8	±1.9	1206	±37	523000	±11000	0.0151	±0.008
353368	48	RIM	Main Population	PS	224	±6	8.7	±0.8	967	±43	402600	±8400	b.l.d.	
353368	49	RIM	Main Population	PS	79	±17	4.1	±1.0	305	±63	240000	±50000	0.0259	±0.009
353369	1	RIM	Main Population	PS	227	±24	5.2	±1.3	769	±22	427500	±8100	0.0630	±0.034
353369	2	RIM	Main Population	PS	134	±6	4.1	±0.6	226	±10	421000	±12000	b.l.d.	
353369	2	CORE	Main Population	PS	199	±6	4.7	±0.6	976	±27	405000	±10000	0.0141	±0.007
353369	3	RIM	Main Population	PS	158	±8	6.0	±1.0	534	±32	463000	±14000	b.l.d.	
353369	4	RIM	Main Population	PS	94	±22	2.6	±0.8	500	±120	247000	±58000	0.0380	±0.010
353369	5	RIM	Inherited	PS	200	±7	8.1	±0.7	470	±5	433000	±12000	0.0085	±0.005
353369	6	RIM	Main Population	PS	166	±6	5.4	±0.6	429	±13	426000	±13000	b.l.d.	
353369	7	RIM	Main Population	PS	264	±8	14.1	±0.8	1363	±35	419000	±11000	0.0111	±0.003
353369	8	RIM	Main Population	PS	163	±6	6.3	±0.7	485	±13	412000	±12000	0.0088	±0.007
353369	9	RIM	Inherited	PS	174	±5	5.3	±0.7	293	±14	400800	±8800	b.l.d.	
353369	10	RIM	Main Population	PS	126	±6	3.6	±0.6	328	±9	420000	±12000	b.l.d.	
353369	11	RIM	Lead Loss	PS	275	±14	11.7	±1.8	529	±17	430300	±6800	0.2380	±0.049
353369	11	CORE	Main Population	PS	327	±16	6.7	±1.2	968	±67	375500	±6200	0.0980	±0.028
353369	12	RIM	Main Population	PS	152	±6	4.3	±0.7	330	±15	411000	±10000	b.l.d.	
353369	13	RIM	Inherited	PS	198	±10	5.0	±1.2	711	±45	459700	±9700	0.0180	±0.014
353369	14	RIM	Inherited	PS	158	±6	5.8	±0.6	375	±21	419000	±11000	b.l.d.	
353369	15	RIM	Main Population	PS	117	±5	3.6	±0.6	365	±14	419000	±11000	b.l.d.	
353369	16	RIM	Main Population	PS	157	±7	5.9	±0.7	371	±6	420000	±12000	b.l.d.	
353369	17	RIM	Main Population	PS	239	±23	5.2	±0.6	700	±110	408000	±12000	0.0064	±0.003
353369	18	RIM	Main Population	PS	192	±6	6.5	±0.6	439	±7	420000	±10000	0.0122	±0.006
353369	19	RIM	Lead Loss	PS	188	±7	6.5	±1.0	645	±21	412700	±6600	0.0057	±0.004
353369	20	RIM	Main Population	PS	205	±8	6.4	±0.7	602	±11	444000	±12000	0.0290	±0.011
353369	21	RIM	Titanite/Apatite Inclusions	PS	9400	±2800	3.9	±0.7	379	±17	423000	±11000	67.0000	±21.000
353369	22	RIM	Main Population	PS	202	±8	5.0	±0.7	602	±14	419000	±11000	b.l.d.	
353369	23	RIM	Main Population	PS	130	±5	3.5	±0.6	338	±10	408600	±9300	b.l.d.	
353369	24	RIM	Main Population	PS	129	±7	4.2	±0.6	274	±5	426000	±11000	b.l.d.	

Table A1. 2 continued: Zircon geochemistry for P, Ti, Y, Zr and La. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	31 P		49 Ti		89 Y		91 Zr		139 La	
353369	25	RIM	Main Population	PS	107	±6	3.2	±0.6	346	±15	435000	±12000	b.l.d.	
353369	26	RIM	Main Population	PS	153	±6	5.7	±0.8	361	±13	435000	±13000	b.l.d.	
353369	27	RIM	Inherited	PS	193	±7	6.3	±0.7	536	±16	428000	±13000	b.l.d.	
353369	28	RIM	Main Population	PS	130	±6	4.3	±0.6	319	±15	421000	±11000	b.l.d.	
353369	29	RIM	Main Population	PS	254	±7	9.6	±0.9	723	±31	426000	±12000	b.l.d.	
353369	30	RIM	Main Population	PS	166	±8	5.4	±0.8	559	±30	457000	±11000	0.0056	±0.003
353369	31	RIM	Main Population	PS	154	±11	6.7	±1.1	408	±7	437800	±7900	0.0660	±0.017
353369	32	RIM	Main Population	PS	696	±36	7.4	±1.4	2590	±120	376400	±5100	0.2200	±0.072
353369	33	RIM	Main Population	PS	187	±31	8.2	±3.3	644	±82	494100	±8500	0.1700	±0.048
353369	34	RIM	Main Population	PS	143	±7	4.3	±0.6	282	±7	409000	±10000	b.l.d.	
353369	35	RIM	Main Population	PS	136	±6	4.9	±0.6	263	±16	424000	±12000	b.l.d.	
353369	36	RIM	Inherited	PS	292	±13	9.3	±1.1	1202	±66	480300	±9800	0.0450	±0.011
353369	37	RIM	Main Population	PS	323	±28	9.2	±1.1	805	±38	440000	±12000	0.0251	±0.008
353369	38	RIM	Inherited	PS	152	±31	7.1	±1.7	457	±96	315000	±68000	0.0088	±0.005
353369	39	RIM	Titanite/Apatite Inclusions	PS	930	±180	11.4	±2.8	1066	±88	376000	±20000	8.5000	±2.300
353369	40	RIM	Main Population	PS	95	±23	3.1	±0.9	400	±100	195000	±49000	0.0033	±0.002
353369	41	RIM	Main Population	PS	235	±10	6.8	±0.8	933	±66	442000	±13000	0.0075	±0.004
353369	42	RIM	Discordant	PS	83	±22	3.9	±1.3	227	±68	242000	±74000	0.0067	±0.003
353369	43	RIM	Main Population	PS	72	±23	2.2	±0.9	258	±83	200000	±64000	0.0097	±0.004
353369	44	RIM	Main Population	PS	133	±6	3.7	±0.6	316	±9	424000	±10000	b.l.d.	
353369	45	RIM	Main Population	PS	204	±7	6.1	±0.7	592	±12	427000	±10000	b.l.d.	
353369	46	RIM	Main Population	PS	177	±6	5.0	±0.7	480	±13	425000	±11000	0.0148	±0.004
353369	47	RIM	Main Population	PS	96	±18	3.1	±0.8	193	±35	300000	±55000	0.0600	±0.022
353369	48	RIM	Inherited	PS	173	±6	5.7	±0.7	388	±7	423000	±11000	b.l.d.	
353369	49	RIM	Discordant	PS	160	±10	7.7	±1.0	422	±33	467000	±12000	0.0480	±0.015
353369	50	RIM	Discordant	PS	196	±6	9.1	±0.8	444	±18	430000	±11000	b.l.d.	
353369	51	RIM	Main Population	PS	263	±7	7.2	±1.1	1214	±13	414000	±11000	0.0610	±0.017
353381	1	RIM	Discordant	UR	156	±22	3.7	±3.3	550	±38	406000	±22000	0.0170	±0.014
353381	2	RIM	Lead Loss	UR	521	±41	5.0	±0.7	2363	±88	435900	±8800	0.0630	±0.016
353381	3	RIM	Lead Loss	UR	255	±18	8.3	±2.0	1295	±37	459000	±11000	0.1800	±0.049
353381	4	RIM	Main Population	UR	256	±11	6.8	±1.3	1280	±100	478000	±11000	0.0227	±0.009

Table A1. 2 continued: Zircon geochemistry for P, Ti, Y, Zr and La. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	31 P		49 Ti		89 Y		91 Zr		139 La	
353381	5	RIM	Main Population	UR	502	±20	3.1	±1.4	1455	±26	510000	±15000	b.l.d.	
353381	6	RIM	Main Population	UR	204	±19	4.3	±1.9	854	±72	499300	±9400	0.0340	±0.013
353381	7	RIM	Inherited	UR	191	±20	2.9	±0.7	550	±51	412000	±12000	b.l.d.	
353381	8	RIM	Main Population	UR	231	±13	8.1	±1.6	1387	±54	418800	±9600	0.0970	±0.027
353381	9	RIM	Titanite/Apatite Inclusions	UR	4000	±760	5.8	±1.3	1820	±170	450000	±15000	28.3000	±6.800
353381	10	CORE	Main Population	UR	271	±8	8.6	±0.8	964	±23	413000	±11000	0.0182	±0.006
353381	10	RIM	Inherited	UR	58	±19	0.5	±0.3	400	±150	140000	±50000	0.0021	±0.001
353381	11	RIM	Inherited	UR	232	±7	11.7	±1.0	1034	±16	411000	±12000	0.0121	±0.005
353381	12	RIM	Inherited	UR	331	±18	15.7	±1.9	905	±73	492000	±10000	0.0720	±0.026
353381	13	RIM	Titanite/Apatite Inclusions	UR	2100	±1100	b.l.d.		1160	±320	322000	±56000	b.l.d.	
353381	14	RIM	Main Population	UR	197	±16	16.7	±4.7	1410	±110	481000	±13000	0.0490	±0.019
353381	15	RIM	Main Population	UR	428	±16	5.8	±1.0	1588	±71	419000	±13000	0.0084	±0.005
353381	16	CORE	Inherited	UR	304	±13	6.0	±0.9	1671	±92	459000	±13000	0.0256	±0.008
353381	16	RIM	Main Population	UR	135	±29	2.5	±0.8	660	±150	228000	±52000	0.0106	±0.004
353381	17	RIM	Inherited	UR	158	±8	9.7	±1.3	1419	±60	378500	±6100	0.0870	±0.015
353381	18	RIM	Inherited	UR	292	±15	3.1	±0.9	1233	±66	398300	±8000	b.l.d.	
353381	18	RIM	Main Population	UR	294	±16	3.3	±0.9	1692	±39	444000	±15000	0.0127	±0.007
353381	19	RIM	Lead Loss	UR	269	±19	5.6	±1.5	1825	±35	496000	±12000	0.0310	±0.016
353381	20	RIM	Inherited	UR	194	±17	6.8	±2.0	886	±65	456300	±9700	0.0590	±0.025
353381	21	RIM	Main Population	UR	174	±12	5.5	±1.2	861	±12	423200	±9100	0.0210	±0.011
353381	23	RIM	Lead Loss	UR	253	±17	5.8	±1.7	1616	±54	427400	±6600	0.0660	±0.016
353381	24	RIM	Main Population	UR	775	±18	8.2	±0.8	3511	±80	414000	±13000	0.0111	±0.005
353381	25	RIM	Lead Loss	UR	341	±42	4.9	±1.2	1423	±50	475000	±10000	1.0500	±0.530
353381	26	RIM	Lead Loss	UR	319	±32	3.6	±2.3	2007	±35	503300	±8400	b.l.d.	
353381	27	RIM	Main Population	UR	305	±19	7.1	±2.2	924	±87	523000	±11000	0.0130	±0.010
353381	28	RIM	Main Population	UR	268	±22	5.4	±1.2	1684	±83	469000	±14000	0.0211	±0.009
353381	29	RIM	Main Population	UR	349	±20	10.1	±2.5	1107	±67	478000	±17000	0.1130	±0.054
353381	30	RIM	Lead Loss	UR	406	±18	5.2	±1.3	1392	±67	442000	±12000	0.0179	±0.006
353381	31	RIM	Discordant	UR	248	±17	11.3	±3.5	997	±39	491000	±11000	0.0440	±0.018
353381	32	RIM	Lead Loss	UR	206	±26	3.8	±2.5	1610	±150	450000	±12000	0.1890	±0.050
353381	33	RIM	Inherited	UR	193	±11	3.0	±1.0	699	±48	482000	±11000	b.l.d.	

Table A1. 2 continued: Zircon geochemistry for P, Ti, Y, Zr and La. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	31 P		49 Ti		89 Y		91 Zr		139 La	
353381	33	RIM	Main Population	UR	233	±15	5.6	±1.3	1258	±46	499000	±15000	0.0380	±0.013
353381	34	RIM	Rejected	UR	333	±41	49.0	±15.0	950	±110	506000	±22000	0.0520	±0.045
353381	35	RIM	Main Population	UR	419	±40	4.6	±2.1	1450	±150	497200	±8900	b.l.d.	
353381	36	RIM	Main Population	UR	56	±9	8.9	±1.4	1530	±110	455000	±15000	0.1110	±0.019
353381	37	RIM	Discordant	UR	174	±31	13.7	±6.7	1145	±73	473000	±31000	0.1490	±0.079
353381	38	RIM	Main Population	UR	259	±16	2.5	±0.9	696	±55	468000	±17000	0.0128	±0.009
353381	39	RIM	Inherited	UR	251	±22	5.8	±2.1	891	±30	496800	±9200	0.0170	±0.012
353381	40	RIM	Lead Loss	UR	195	±9	4.5	±0.7	906	±23	442200	±7700	0.0214	±0.006
353381	41	RIM	Main Population	UR	354	±15	8.7	±1.6	1960	±150	481000	±11000	0.1750	±0.038
353381	42	RIM	Rejected	UR	5880	±920	3590.0	±920.0	783	±42	466000	±13000	78.0000	±14.000
353381	42	RIM	Main Population	UR	271	±14	5.2	±1.4	1643	±29	490000	±11000	b.l.d.	
353381	43	RIM	Rejected	UR	343	±99	106.0	±52.0	900	±150	418000	±45000	0.0650	±0.078
353381	44	RIM	Main Population	UR	439	±10	5.1	±0.8	1981	±51	427000	±13000	0.0125	±0.005
353381	45	RIM	Discordant	UR	193	±38	9.2	±3.5	1215	±47	489000	±19000	0.0660	±0.027
353381	46	RIM	Inherited	UR	191	±62	10.9	±3.7	700	±240	320000	±100000	0.1490	±0.066
353381	47	RIM	Main Population	UR	432	±17	9.0	±1.7	1327	±97	469000	±12000	0.1800	±0.033
353381	48	RIM	Inherited	UR	367	±38	3.6	±1.0	1290	±150	412000	±9300	0.0181	±0.010
353381	49	RIM	Lead Loss	UR	253	±14	6.3	±0.9	889	±13	418400	±9200	0.1200	±0.019
353384	1	RIM	Inherited	PB	288	±8	21.5	±1.2	1041	±37	414000	±12000	0.0388	±0.008
353384	2	RIM	Titanite/Apatite Inclusions	PB	214	±13	37.0	±11.0	891	±74	450000	±13000	0.3400	±0.210
353384	3	RIM	Inherited	PB	140	±13	5.0	±1.0	612	±35	443000	±18000	0.0122	±0.008
353384	4	RIM	Main Population	PB	900	±95	22.1	±4.9	7980	±470	492000	±17000	0.1680	±0.051
353384	5	RIM	Main Population	PB	240	±9	20.4	±1.3	1036	±54	441000	±14000	0.0176	±0.005
353384	6	RIM	Inherited	PB	68	±9	7.7	±1.9	488	±56	467000	±11000	0.0950	±0.032
353384	7	RIM	Inherited	PB	180	±16	10.8	±2.0	1031	±24	492000	±17000	0.0980	±0.028
353384	8	RIM	Discordant	PB	392	±35	11.0	±2.3	2610	±250	518000	±19000	0.0650	±0.021
353384	9	RIM	Inherited	PB	199	±9	6.9	±1.1	1053	±34	456000	±17000	0.0079	±0.006
353384	10	RIM	Lead Loss	PB	356	±42	17.6	±2.6	877	±56	452000	±26000	1.3900	±0.410
353384	11	RIM	Inherited	PB	150	±8	10.7	±1.3	408	±9	435200	±9200	0.0216	±0.005
353384	12	RIM	Main Population	PB	363	±22	22.7	±2.5	1885	±86	503000	±11000	0.0420	±0.015
353384	13	RIM	Discordant	PB	252	±7	21.0	±1.2	1095	±26	412000	±11000	0.0325	±0.007

Table A1. 2 continued: Zircon geochemistry for P, Ti, Y, Zr and La. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	31 P		49 Ti		89 Y		91 Zr		139 La	
353384	13	CORE	Main Population	PB	236	±8	20.3	±1.2	1061	±32	421000	±12000	0.0268	±0.006
353384	14	RIM	Discordant	PB	207	±11	17.9	±1.4	535	±13	457000	±13000	0.0210	±0.017
353384	15	RIM	Main Population	PB	208	±15	21.8	±1.9	1126	±38	504000	±13000	0.0350	±0.016
353384	16	RIM	Main Population	PB	213	±9	18.7	±1.8	542	±9	405900	±7800	0.0390	±0.011
353384	17	RIM	Lead Loss	PB	227	±9	19.9	±1.3	999	±86	449000	±12000	0.0252	±0.007
353384	18	RIM	Inherited	PB	169	±16	13.3	±2.8	760	±48	507000	±13000	0.1150	±0.038
353384	19	RIM	Discordant	PB	195	±11	20.2	±2.3	587	±52	408000	±13000	0.0410	±0.014
353384	20	RIM	Inherited	PB	253	±16	7.3	±1.2	1090	±180	460000	±14000	0.0330	±0.011
353385	1	RIM	Inherited	UR	150	±7	6.6	±0.7	407	±24	414000	±10000	0.0223	±0.008
353385	2	RIM	Main Population	UR	507	±12	22.3	±1.2	3758	±37	474900	±7100	0.0247	±0.008
353385	3	RIM	Discordant	UR	55	±13	2.9	±0.8	152	±36	218000	±53000	b.l.d.	
353385	4	RIM	Inherited	UR	166	±18	5.5	±2.0	279	±11	354700	±5600	0.0960	±0.028
353385	5	RIM	Inherited	UR	222	±18	9.3	±1.0	1420	±220	445300	±6700	0.0438	±0.009
353385	6	RIM	Inherited	UR	292	±10	10.1	±0.8	1229	±87	415000	±10000	0.0496	±0.010
353385	7	RIM	Inherited	UR	212	±29	11.4	±2.0	694	±54	454000	±15000	0.1170	±0.047
353385	8	RIM	Discordant	UR	760	±35	21.6	±3.0	6900	±500	517000	±12000	0.2430	±0.040
353385	9	RIM	Inherited	UR	327	±22	8.9	±0.9	2510	±240	414000	±11000	0.0710	±0.010
353385	10	RIM	Main Population	UR	473	±14	11.3	±0.8	3250	±130	411000	±9700	0.1020	±0.010
353385	11	RIM	Inherited	UR	154	±5	5.2	±0.6	295	±9	427000	±11000	b.l.d.	
353385	12	RIM	Rejected	UR	916	±48	7.9	±0.8	974	±77	428800	±8900	6.4100	±0.440
353385	12	RIM	Inherited	UR	101	±11	3.7	±0.7	301	±32	360000	±37000	0.0038	±0.002
353385	13	RIM	Inherited	UR	194	±9	8.9	±0.7	493	±37	427000	±10000	0.0139	±0.005
353385	14	RIM	Inherited	UR	164	±16	7.2	±1.0	910	±180	479600	±7900	0.0430	±0.010
353385	15	RIM	Lead Loss	UR	153	±36	4.4	±1.2	2240	±540	252000	±64000	0.0640	±0.018
353385	16	RIM	Inherited	UR	193	±6	6.4	±0.7	567	±62	417000	±11000	0.0128	±0.005
353385	17	RIM	Inherited	UR	60	±17	5.4	±2.0	198	±57	212000	±61000	0.0030	±0.002
353385	18	RIM	Inherited	UR	38	±10	1.6	±0.5	88	±24	159000	±43000	0.0033	±0.002
353385	19	RIM	Inherited	UR	207	±7	9.3	±0.8	1292	±47	455000	±12000	0.0298	±0.007
353385	20	RIM	Main Population	UR	342	±18	9.1	±1.2	995	±52	472000	±11000	0.0086	±0.006
353385	21	RIM	Inherited	UR	154	±8	8.3	±0.9	354	±6	456000	±11000	0.0054	±0.004
353385	22	RIM	Main Population	UR	903	±16	19.8	±1.4	5020	±110	409900	±9300	0.0792	±0.009

Table A1. 2 continued: Zircon geochemistry for P, Ti, Y, Zr and La. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	31 P		49 Ti		89 Y		91 Zr		139 La	
353385	23	RIM	Inherited	UR	200	±16	6.6	±1.1	293	±5	360800	±4600	0.0520	±0.027
353385	24	RIM	Main Population	UR	211	±7	5.1	±0.7	700	±37	395600	±7000	0.0181	±0.008
353385	25	RIM	Inherited	UR	234	±25	22.0	±5.8	1137	±58	490000	±24000	0.0890	±0.038
353385	26	RIM	Inherited	UR	61	±16	2.8	±0.8	170	±45	187000	±50000	0.0016	±0.001
353385	27	CORE	Inherited	UR	223	±18	7.5	±1.2	970	±56	383100	±6100	0.0352	±0.009
353385	27	RIM	Inherited	UR	179	±10	5.9	±0.9	521	±18	496600	±8700	0.0115	±0.007
353385	28	RIM	Inherited	UR	189	±10	7.0	±0.7	724	±56	452700	±6800	0.0157	±0.004
353385	29	RIM	Main Population	UR	253	±17	8.2	±1.8	1117	±20	454000	±11000	0.1070	±0.025
353385	30	RIM	Main Population	UR	212	±7	5.0	±0.6	850	±16	419900	±9800	b.l.d.	
353385	30	CORE	Inherited	UR	207	±75	3.0	±1.2	1720	±650	166000	±56000	0.0670	±0.027
353385	31	CORE	Inherited	UR	164	±14	6.0	±1.2	605	±55	457000	±15000	0.0154	±0.008
353385	31	RIM	Inherited	UR	143	±9	5.4	±0.8	746	±73	446000	±14000	0.0240	±0.011
353385	32	RIM	Rejected	UR	1110	±110	9.8	±0.8	844	±36	413700	±9700	6.9000	±1.100
353385	33	RIM	Inherited	UR	122	±6	5.1	±0.6	513	±15	429400	±9700	0.0065	±0.003
353385	33	CORE	Lead Loss	UR	119	±6	5.4	±0.7	286	±13	440000	±4900	0.0630	±0.013
353385	34	RIM	Main Population	UR	266	±15	9.9	±1.2	2200	±190	466000	±11000	0.0680	±0.014
353388	1	RIM	Main Population	PB	271	±12	9.8	±1.0	1004	±42	457000	±14000	0.0106	±0.005
353388	2	RIM	Main Population	PB	238	±7	13.0	±1.2	523	±13	415000	±11000	0.0039	±0.003
353388	3	RIM	Main Population	PB	195	±11	13.1	±1.2	733	±71	431000	±12000	0.0049	±0.004
353388	4	RIM	Main Population	PB	280	±8	10.5	±1.0	854	±37	407800	±9100	0.0118	±0.005
353388	5	RIM	Main Population	PB	208	±9	11.1	±1.0	609	±16	468000	±12000	0.0400	±0.014
353388	6	RIM	Inherited	PB	278	±19	13.5	±1.4	1140	±180	459000	±13000	0.0179	±0.007
353388	7	RIM	Discordant	PB	197	±5	13.9	±1.3	443	±11	422000	±11000	0.0418	±0.009
353388	8	RIM	Main Population	PB	205	±7	11.1	±0.9	556	±52	437000	±13000	b.l.d.	
353388	9	RIM	Discordant	PB	232	±7	13.1	±1.1	439	±11	414000	±11000	0.0073	±0.004
353388	10	RIM	Discordant	PB	158	±9	11.9	±1.2	575	±74	468000	±14000	b.l.d.	
353388	11	RIM	Main Population	PB	232	±8	11.9	±1.1	1120	±100	433000	±12000	0.0101	±0.005
353388	12	RIM	Main Population	PB	229	±9	18.0	±1.4	791	±26	486000	±11000	0.1250	±0.056
353388	13	RIM	Discordant	PB	233	±7	13.4	±0.9	792	±52	416000	±11000	b.l.d.	
353388	14	RIM	Main Population	PB	294	±11	19.7	±1.6	521	±18	485000	±12000	0.1900	±0.022
353388	15	RIM	Main Population	PB	221	±15	12.1	±1.6	1299	±19	476000	±18000	0.0460	±0.030

Table A1. 2 continued: Zircon geochemistry for P, Ti, Y, Zr and La. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	31 P		49 Ti		89 Y		91 Zr		139 La	
353388	16	RIM	Main Population	PB	228	±10	12.3	±1.6	1180	±150	492000	±14000	0.1190	±0.068
353388	17	RIM	Inherited	PB	246	±10	17.2	±1.4	1454	±50	462000	±13000	0.0430	±0.011
353388	19	RIM	Main Population	PB	207	±8	9.7	±0.7	653	±42	412000	±12000	b.l.d.	
353388	20	RIM	Main Population	PB	239	±7	14.8	±0.9	428	±8	415000	±11000	b.l.d.	
353388	21	RIM	Main Population	PB	230	±9	12.3	±1.1	1064	±27	449000	±13000	0.0068	±0.004
353388	22	RIM	Main Population	PB	247	±8	18.7	±1.2	592	±13	472000	±12000	0.0035	±0.003
353388	23	RIM	Main Population	PB	279	±8	18.2	±1.2	1000	±37	419000	±11000	0.0346	±0.006
353388	24	RIM	Main Population	PB	212	±6	9.9	±0.9	1100	±33	431000	±13000	0.0302	±0.008
353388	25	RIM	Main Population	PB	203	±8	8.6	±0.8	488	±6	396900	±8100	0.0122	±0.008
353388	26	RIM	Discordant	PB	254	±9	12.5	±1.1	1015	±49	413000	±11000	0.0229	±0.008
353388	27	RIM	Main Population	PB	303	±12	10.9	±1.5	683	±23	483200	±9100	0.0250	±0.010
353388	28	RIM	Discordant	PB	272	±9	14.9	±1.2	1296	±78	429000	±12000	0.0141	±0.004
353388	29	RIM	Lead Loss	PB	256	±16	8.3	±1.0	764	±39	419200	±4400	0.2250	±0.036
353388	30	RIM	Discordant	PB	261	±12	12.1	±1.8	873	±47	415800	±5700	0.0900	±0.023
353388	31	RIM	Main Population	PB	295	±12	8.8	±0.8	817	±66	427000	±12000	0.0068	±0.003
353388	32	RIM	Discordant	PB	110	±40	19.0	±1.5	530	±220	222000	±92000	0.0173	±0.008
353388	33	RIM	Main Population	PB	203	±8	8.1	±1.0	553	±11	471000	±12000	b.l.d.	
353388	34	RIM	Main Population	PB	309	±13	16.0	±1.4	2470	±140	479500	±9900	0.0414	±0.008
353388	35	RIM	Main Population	PB	228	±10	10.3	±1.2	767	±49	462000	±14000	0.0136	±0.006
353388	36	RIM	Main Population	PB	220	±9	15.0	±1.0	609	±8	481000	±12000	0.0490	±0.020
353388	37	RIM	Lead Loss	PB	97	±50	6.0	±4.2	320	±190	141000	±88000	0.5200	±0.120
353388	38	RIM	Main Population	PB	196	±6	9.4	±0.8	456	±10	423000	±11000	b.l.d.	
353388	39	RIM	Main Population	PB	257	±8	11.0	±1.0	614	±18	434000	±13000	b.l.d.	
353388	40	RIM	Main Population	PB	204	±12	9.8	±1.2	584	±8	503000	±8800	0.0250	±0.012
353388	41	RIM	Titanite/Apatite Inclusions	PB	3260	±390	14.5	±1.8	1018	±28	451000	±12000	29.3000	±3.800
353388	42	RIM	Rejected	PB	290	±38	12.8	±3.4	799	±75	418000	±33000	0.9900	±0.260
353388	43	RIM	Main Population	PB	218	±6	12.4	±1.0	512	±18	431000	±11000	b.l.d.	
353388	44	RIM	Lead Loss	PB	212	±7	12.7	±1.0	436	±18	421000	±11000	0.0231	±0.009
353388	45	RIM	Main Population	PB	188	±11	11.8	±1.7	702	±14	526000	±13000	0.0430	±0.015
353388	46	RIM	Main Population	PB	212	±6	8.6	±0.8	463	±16	433000	±12000	0.0096	±0.004
353388	47	RIM	Titanite/Apatite Inclusions	PB	285	±13	21.5	±1.9	739	±33	472800	±7600	3.1400	±0.770

Table A1. 2 continued: Zircon geochemistry for P, Ti, Y, Zr and La. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	31 P		49 Ti		89 Y		91 Zr		139 La	
353388	48	RIM	Main Population	PB	205	±12	10.6	±1.2	473	±14	425000	±14000	0.0191	±0.009
353388	49	RIM	Main Population	PB	258	±7	14.5	±0.9	964	±24	418000	±11000	0.0080	±0.003
353388	50	RIM	Inherited	PB	258	±12	10.1	±1.3	780	±27	348300	±2800	0.0280	±0.016
353390	1	RIM	Titanite/Apatite Inclusions	PB	1370	±400	8.9	±1.0	491	±5	413000	±11000	9.4000	±3.400
353390	2	CORE	Inherited	PB	164	±6	7.6	±0.7	547	±13	417100	±9600	0.0112	±0.004
353390	2	RIM	Inherited	PB	91	±6	2.8	±0.7	218	±2	436000	±13000	b.l.d.	
353390	3	RIM	Discordant	PB	186	±17	6.7	±2.3	1260	±130	455000	±18000	0.0350	±0.022
353390	4	RIM	Main Population	PB	248	±56	11.8	±5.6	1188	±78	430000	±28000	0.0870	±0.039
353390	5	RIM	Main Population	PB	231	±8	7.2	±0.8	1024	±36	411000	±11000	0.0327	±0.008
353390	6	RIM	Lead Loss	PB	112	±32	3.2	±1.1	740	±210	279000	±80000	0.0400	±0.016
353390	7	RIM	Lead Loss	PB	164	±7	4.9	±0.7	775	±37	426400	±9700	0.0194	±0.007
353390	8	RIM	Main Population	PB	290	±27	5.1	±1.0	1272	±42	442000	±10000	0.0930	±0.025
353390	9	RIM	Titanite/Apatite Inclusions	PB	696	±91	4.1	±0.6	682	±21	419000	±11000	4.4000	±0.780
353390	10	RIM	Main Population	PB	277	±10	7.6	±0.8	467	±25	410000	±11000	0.0052	±0.003
353390	11	RIM	Discordant	PB	211	±6	9.2	±0.7	691	±34	422000	±11000	b.l.d.	
353390	12	RIM	Main Population	PB	216	±7	11.2	±0.8	458	±12	419000	±12000	b.l.d.	
353390	13	CORE	Discordant	PB	220	±7	9.0	±1.1	674	±34	420000	±11000	0.0087	±0.003
353390	13	RIM	Main Population	PB	200	±11	3.5	±0.6	936	±9	409000	±11000	0.0470	±0.012
353390	14	RIM	Lead Loss	PB	269	±11	10.2	±1.1	722	±24	441000	±13000	0.0053	±0.004
353390	15	RIM	Main Population	PB	180	±6	7.0	±0.7	351	±8	418000	±11000	0.0029	±0.002
353390	16	RIM	Main Population	PB	213	±6	11.6	±0.9	501	±12	425000	±12000	0.0152	±0.005
353390	17	RIM	Discordant	PB	207	±19	4.4	±1.0	1135	±83	495800	±9500	0.0900	±0.029
353390	18	RIM	Lead Loss	PB	197	±12	4.4	±1.0	1345	±74	475000	±10000	0.0118	±0.006
353390	19	RIM	Main Population	PB	202	±9	9.6	±0.9	360	±13	417000	±12000	b.l.d.	
353390	20	RIM	Main Population	PB	194	±13	6.6	±0.9	849	±51	446000	±11000	0.0760	±0.033
353390	21	RIM	Main Population	PB	216	±7	13.0	±0.9	471	±12	422000	±12000	b.l.d.	
353390	22	RIM	Main Population	PB	175	±6	7.0	±0.8	461	±10	408000	±10000	b.l.d.	
353390	23	RIM	Main Population	PB	213	±16	7.2	±1.9	1060	±26	502400	±5600	0.1080	±0.041
353390	24	RIM	Lead Loss	PB	246	±35	6.6	±1.3	800	±120	333000	±54000	0.2980	±0.044
353390	25	RIM	Main Population	PB	241	±11	8.5	±1.5	750	±29	447000	±13000	0.0480	±0.012
353390	26	RIM	Inherited	PB	200	±8	9.7	±1.0	476	±17	438000	±14000	b.l.d.	

Table A1. 2 continued: Zircon geochemistry for P, Ti, Y, Zr and La. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	31 P		49 Ti		89 Y		91 Zr		139 La	
353390	27	RIM	Lead Loss	PB	157	±10	7.1	±1.3	505	±18	462000	±12000	0.1470	±0.033
353390	28	RIM	Main Population	PB	127	±22	2.7	±0.7	850	±150	321000	±57000	0.0059	±0.003
353390	29	RIM	Discordant	PB	160	±7	3.4	±0.7	586	±43	382400	±6300	0.0116	±0.005
353390	30	RIM	Main Population	PB	168	±6	3.8	±0.7	602	±11	414000	±11000	b.l.d.	
353390	31	RIM	Main Population	PB	230	±9	8.4	±1.0	860	±62	440000	±12000	0.0430	±0.008
353390	32	RIM	Main Population	PB	218	±8	6.3	±1.1	666	±6	486000	±13000	0.0105	±0.010
353390	33	CORE	Main Population	PB	231	±8	11.0	±1.1	1095	±58	409100	±9400	0.0086	±0.003
353390	33	MID	Main Population	PB	212	±9	10.7	±1.2	906	±59	423000	±12000	0.0072	±0.003
353390	33	RIM	Main Population	PB	214	±9	8.3	±1.1	1414	±21	455000	±11000	0.1010	±0.030
353390	34	RIM	Main Population	PB	224	±9	7.0	±0.9	1167	±51	418000	±12000	0.0136	±0.006
353390	35	RIM	Main Population	PB	172	±6	4.7	±0.7	667	±25	424000	±10000	0.0470	±0.015
353390	36	RIM	Discordant	PB	135	±7	4.7	±1.0	695	±9	442000	±13000	0.0108	±0.006
353390	37	RIM	Main Population	PB	430	±58	6.4	±3.4	1212	±90	437000	±31000	0.0480	±0.029
353390	38	RIM	Lead Loss	PB	180	±8	5.8	±0.9	1106	±36	405000	±14000	0.0110	±0.008
353390	39	RIM	Main Population	PB	138	±24	6.6	±1.6	820	±150	386000	±63000	0.0080	±0.005
353390	40	CORE	Inherited	PB	246	±8	10.8	±0.9	734	±42	412000	±10000	0.0067	±0.003
353390	40	RIM	Main Population	PB	208	±7	9.0	±1.0	442	±10	426000	±12000	b.l.d.	
353390	41	RIM	Lead Loss	PB	66	±20	4.1	±1.4	176	±49	188000	±55000	0.0126	±0.005
353390	42	RIM	Discordant	PB	570	±120	4.6	±1.2	1740	±290	480200	±7600	0.0490	±0.023
353390	43	RIM	Main Population	PB	210	±7	8.2	±1.4	820	±29	457000	±12000	0.0252	±0.009
353390	44	RIM	Inherited	PB	132	±5	3.7	±0.7	303	±12	413000	±10000	0.0064	±0.004
353390	44	CORE	Inherited	PB	269	±8	9.8	±0.8	801	±21	422300	±9100	0.0069	±0.003
353390	45	RIM	Inherited	PB	224	±10	3.5	±0.6	1065	±92	414000	±11000	b.l.d.	
353390	46	RIM	Main Population	PB	144	±10	3.6	±1.0	744	±19	478000	±10000	b.l.d.	
353390	47	RIM	Main Population	PB	130	±6	5.5	±0.9	250	±13	418000	±11000	b.l.d.	
353390	48	RIM	Discordant	PB	175	±6	5.7	±0.7	797	±18	425000	±11000	b.l.d.	
353390	48	CORE	Main Population	PB	205	±7	9.1	±0.8	363	±8	420900	±9900	b.l.d.	
353393	1	RIM	Main Population	TYC	166	±12	3.8	±0.8	992	±18	463000	±13000	0.1740	±0.055
353393	2	RIM	Main Population	TYC	93	±16	7.8	±2.6	493	±26	494000	±14000	0.3000	±0.120
353393	3	RIM	Discordant	TYC	74	±12	3.2	±1.4	382	±21	461000	±20000	0.1130	±0.031
353393	4	RIM	Discordant	TYC	101	±5	2.6	±0.7	787	±58	435000	±12000	0.0283	±0.008

Table A1. 2 continued: Zircon geochemistry for P, Ti, Y, Zr and La. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	31 P		49 Ti		89 Y		91 Zr		139 La	
353393	5	RIM	Main Population	TYC	55	±5	2.0	±0.6	463	±19	416000	±11000	0.0308	±0.007
353393	6	CORE	Inherited	TYC	160	±8	3.9	±0.7	547	±50	418000	±11000	0.0435	±0.009
353393	6	RIM	Main Population	TYC	64	±5	b.l.d.		351	±11	418000	±11000	0.0123	±0.005
353393	7	RIM	Discordant	TYC	105	±6	3.3	±0.6	549	±31	440600	±9500	0.1510	±0.023
353393	8	CORE	Main Population	TYC	107	±8	3.2	±0.6	570	±14	423000	±12000	0.0076	±0.004
353393	8	RIM	Discordant	TYC	65	±12	3.9	±1.3	485	±76	293000	±44000	0.0840	±0.021
353393	9	RIM	Lead Loss	TYC	78	±10	3.6	±1.6	579	±16	469300	±8700	0.0990	±0.033
353393	10	RIM	Main Population	TYC	55	±13	1.6	±0.5	357	±83	181000	±44000	0.0310	±0.012
353393	11	RIM	Inherited	TYC	145	±8	9.6	±1.4	303	±9	424700	±9200	b.l.d.	
353393	12	RIM	Discordant	TYC	97	±7	3.1	±0.9	1049	±31	465000	±10000	0.0340	±0.014
353393	13	RIM	Main Population	TYC	132	±11	2.5	±0.8	785	±50	466000	±12000	0.0195	±0.009
353393	14	RIM	Main Population	TYC	57	±10	5.0	±1.6	638	±23	479000	±12000	0.1160	±0.029
353393	15	RIM	Inherited	TYC	102	±9	2.3	±0.8	567	±50	455000	±12000	0.0193	±0.009
353393	16	RIM	Main Population	TYC	68	±6	1.8	±0.6	508	±29	448000	±12000	0.0270	±0.010
353393	17	RIM	Lead Loss	TYC	252	±8	11.7	±0.9	621	±10	416000	±12000	0.0050	±0.003
353393	17	CORE	Lead Loss	TYC	313	±8	13.0	±0.9	979	±42	415000	±11000	0.0168	±0.004
353393	18	RIM	Inherited	TYC	256	±54	b.l.d.		466	±15	348200	±6000	0.1780	±0.056
353393	19	RIM	Main Population	TYC	71	±12	1.9	±1.1	351	±50	503000	±16000	0.0180	±0.012
353393	20	RIM	Main Population	TYC	95	±5	1.8	±0.5	388	±13	415000	±12000	b.l.d.	
353393	21	RIM	Main Population	TYC	153	±7	3.6	±0.7	960	±67	416000	±12000	b.l.d.	
353393	22	RIM	Discordant	TYC	140	±14	4.1	±1.1	654	±43	464000	±17000	0.0530	±0.034
353393	23	RIM	Main Population	TYC	87	±9	3.2	±0.9	853	±87	485000	±11000	0.0152	±0.006
353393	24	RIM	Main Population	TYC	66	±4	2.2	±0.6	600	±10	422000	±13000	0.0061	±0.003
353393	25	RIM	Inherited	TYC	176	±37	8.1	±5.8	430	±37	506000	±28000	0.4200	±0.120
353393	26	RIM	Main Population	TYC	214	±7	3.3	±0.8	667	±17	468000	±14000	b.l.d.	
353393	27	RIM	Main Population	TYC	184	±6	3.4	±0.6	641	±32	417000	±12000	0.0380	±0.006
353393	28	RIM	Main Population	TYC	141	±23	8.8	±2.8	1170	±140	477000	±18000	0.1180	±0.062
353393	29	RIM	Main Population	TYC	66	±13	3.7	±2.1	540	±19	552000	±11000	0.0960	±0.032
353393	30	RIM	Inherited	TYC	200	±8	7.4	±0.8	459	±22	460000	±14000	b.l.d.	
353393	31	RIM	Main Population	TYC	61	±6	2.3	±0.6	282	±20	420000	±13000	0.0262	±0.006
353393	31	CORE	Discordant	TYC	111	±6	2.4	±0.6	426	±11	425000	±11000	0.0900	±0.012

Table A1. 2 continued: Zircon geochemistry for P, Ti, Y, Zr and La. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	31 P		49 Ti		89 Y		91 Zr		139 La	
353393	32	RIM	Inherited	TYC	158	±8	6.6	±0.9	823	±45	421000	±11000	0.0182	±0.005
353393	33	CORE	Main Population	TYC	69	±6	b.l.d.		309	±23	430000	±15000	0.0187	±0.008
353393	33	RIM	Main Population	TYC	60	±6	2.6	±1.1	476	±19	442000	±16000	0.0910	±0.036
353393	34	RIM	Discordant	TYC	76	±10	4.2	±1.7	729	±44	463000	±17000	0.0950	±0.049
353393	35	RIM	Inherited	TYC	148	±14	b.l.d.		750	±110	534000	±13000	b.l.d.	
353393	36	RIM	Main Population	TYC	109	±6	1.7	±0.5	507	±19	414000	±12000	b.l.d.	
353393	37	RIM	Main Population	TYC	52	±13	4.1	±1.3	734	±17	456000	±16000	0.0570	±0.020
353393	38	RIM	Inherited	TYC	80	±13	4.5	±2.1	468	±25	498000	±16000	0.1120	±0.030
353393	39	RIM	Main Population	TYC	55	±8	2.8	±0.9	592	±65	485000	±12000	0.0480	±0.014
353393	40	RIM	Main Population	TYC	72	±5	2.6	±0.7	604	±8	442000	±12000	0.0084	±0.005
353393	41	CORE	Main Population	TYC	147	±11	2.1	±0.8	637	±46	436000	±13000	0.0620	±0.014
353393	41	RIM	Main Population	TYC	85	±8	3.4	±1.0	743	±48	417100	±7700	0.0333	±0.010
353393	42	RIM	Main Population	TYC	47	±4	1.7	±0.6	276	±5	415000	±12000	b.l.d.	
353393	42	CORE	Inherited	TYC	59	±13	b.l.d.		364	±6	345100	±5800	0.0340	±0.017
353393	43	RIM	Inherited	TYC	83	±12	1.8	±0.8	508	±87	470000	±16000	b.l.d.	
353393	44	RIM	Inherited	TYC	106	±7	2.6	±0.7	918	±53	408000	±11000	b.l.d.	
353393	45	RIM	Main Population	TYC	76	±9	2.7	±1.1	643	±12	493000	±12000	0.0450	±0.020
353393	46	RIM	Inherited	TYC	154	±13	1.9	±0.7	509	±9	380000	±5900	0.0830	±0.035
353393	46	CORE	Inherited	TYC	132	±10	3.4	±0.7	929	±51	455000	±12000	0.0740	±0.012
353393	47	RIM	Inherited	TYC	58	±5	1.6	±0.7	298	±7	395200	±8500	0.0017	±0.003
353393	47	CORE	Lead Loss	TYC	210	±33	5.4	±1.5	1161	±17	394200	±6000	0.1780	±0.054
353393	48	CORE	Inherited	TYC	133	±12	1.9	±0.6	347	±20	414000	±11000	0.0560	±0.013
353393	48	RIM	Main Population	TYC	74	±5	2.4	±0.7	385	±32	414000	±12000	0.0034	±0.003
353393	48	CORE	Main Population	TYC	89	±10	b.l.d.		523	±49	458000	±14000	0.0107	±0.005
353393	49	RIM	Discordant	TYC	52	±10	b.l.d.		305	±42	534000	±17000	b.l.d.	
353393	49	CORE	Discordant	TYC	355	±13	9.5	±1.1	3280	±110	378600	±8600	0.0262	±0.009
353393	50	RIM	Lead Loss	TYC	140	±15	22.0	±3.2	1069	±61	438900	±6300	0.0970	±0.026
353393	50	CORE	Lead Loss	TYC	1760	±220	550.0	±110.0	820	±43	412000	±20000	5.5000	±0.810
353393	51	RIM	Inherited	TYC	94	±14	2.4	±0.8	563	±17	504000	±13000	0.0230	±0.013
353393	51	CORE	Main Population	TYC	237	±8	3.4	±0.8	903	±27	407300	±9000	0.0131	±0.004
353393	51	MID	Inherited	TYC	148	±6	4.0	±0.9	803	±50	398200	±6700	b.l.d.	

Table A1. 2 continued: Zircon geochemistry for P, Ti, Y, Zr and La. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	31 P		49 Ti		89 Y		91 Zr		139 La	
353393	52	MID	Main Population	TYC	76	±5	2.0	±0.6	337	±9	429000	±12000	b.l.d.	
353393	52	CORE	Inherited	TYC	178	±6	5.6	±0.8	578	±33	415000	±11000	0.0365	±0.008
353393	52	RIM	Discordant	TYC	58	±5	1.8	±0.5	390	±13	420000	±12000	0.0090	±0.004
353393	53	RIM	Inherited	TYC	291	±12	6.4	±0.9	1033	±38	468000	±12000	0.0191	±0.007
353393	54	RIM	Discordant	TYC	181	±18	23.7	±3.9	682	±32	492000	±12000	0.2020	±0.043

Table A1. 3: Zircon geochemistry for Ce, Pr, Nd, Sm and Eu. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	140 Ce		141 Pr		146 Nd		147 Sm		153 Eu	
353353	1	RIM	Lead Loss	PB	7.5	±0.24	0.023	±0.01	0.22	±0.07	0.8	±0.1	0.22	±0.04
353353	2	RIM	Lead Loss	PB	11.1	±0.29	0.059	±0.02	1.47	±0.18	3.7	±0.3	0.99	±0.09
353353	3	RIM	Lead Loss	PB	9.7	±2.40	0.051	±0.02	0.65	±0.19	1.4	±0.4	0.45	±0.13
353353	4	RIM	Lead Loss	PB	7.8	±0.36	0.010	±0.01	0.32	±0.11	0.8	±0.2	0.20	±0.05
353353	5	RIM	Lead Loss	PB	16.5	±0.30	0.177	±0.04	2.30	±0.34	4.2	±0.5	1.33	±0.14
353353	6	RIM	Main Population	PB	8.3	±0.35	0.017	±0.01	0.38	±0.11	1.3	±0.2	0.35	±0.05
353353	7	RIM	Main Population	PB	16.0	±0.79	0.027	±0.01	0.42	±0.12	1.2	±0.2	0.31	±0.06
353353	8	RIM	Main Population	PB	12.7	±0.37	0.299	±0.05	4.22	±0.46	6.4	±0.5	1.45	±0.14
353353	9	RIM	Main Population	PB	14.2	±0.80	0.042	±0.02	1.06	±0.41	2.0	±0.4	0.47	±0.10
353353	10	RIM	Discordant	PB	32.9	±1.30	0.072	±0.03	0.92	±0.22	2.8	±0.5	0.66	±0.13
353353	11	RIM	Main Population	PB	9.9	±0.38	0.031	±0.01	0.88	±0.17	1.8	±0.2	0.61	±0.09
353353	12	RIM	Main Population	PB	8.6	±0.48	0.030	±0.01	0.55	±0.13	1.5	±0.2	0.37	±0.07
353353	13	RIM	Main Population	PB	12.4	±0.45	0.184	±0.03	2.90	±0.32	5.1	±0.4	1.36	±0.13
353353	14	RIM	Main Population	PB	10.8	±0.24	0.124	±0.02	2.16	±0.26	4.2	±0.4	0.90	±0.09
353353	15	RIM	Lead Loss	PB	10.6	±0.50	0.221	±0.09	2.20	±0.86	6.2	±2.0	2.40	±1.10
353353	16	RIM	Main Population	PB	12.3	±0.44	b.l.d.		0.40	±0.10	1.4	±0.2	0.30	±0.04
353353	17	RIM	Lead Loss	PB	9.2	±0.32	0.033	±0.02	0.55	±0.19	1.3	±0.3	0.38	±0.09
353353	18	RIM	Main Population	PB	11.0	±0.71	0.145	±0.03	2.53	±0.32	5.8	±0.7	1.42	±0.20
353353	19	RIM	Discordant	PB	23.4	±0.82	0.083	±0.04	1.00	±0.45	2.2	±0.7	0.74	±0.18
353353	20	RIM	Main Population	PB	14.9	±0.51	0.087	±0.03	1.37	±0.32	3.4	±0.6	1.09	±0.19
353353	21	RIM	Main Population	PB	8.8	±0.75	0.081	±0.02	1.13	±0.25	2.8	±0.5	0.71	±0.13
353353	22	RIM	Main Population	PB	9.8	±0.54	0.119	±0.03	2.01	±0.24	4.3	±0.5	1.19	±0.14
353353	23	RIM	Lead Loss	PB	8.9	±0.29	0.010	±0.01	0.45	±0.10	1.1	±0.2	0.34	±0.05
353353	24	RIM	Main Population	PB	7.7	±0.26	0.016	±0.01	0.42	±0.12	1.1	±0.2	0.28	±0.05
353353	25	RIM	Main Population	PB	14.1	±0.49	0.071	±0.02	1.70	±0.25	5.0	±0.5	1.28	±0.11
353353	26	RIM	Lead Loss	PB	20.5	±0.75	0.110	±0.04	1.31	±0.24	3.4	±0.5	0.89	±0.14
353353	27	RIM	Main Population	PB	17.6	±0.85	0.038	±0.02	0.87	±0.28	2.1	±0.4	0.60	±0.12
353353	28	RIM	Lead Loss	PB	6.8	±2.10	0.037	±0.02	0.52	±0.17	1.2	±0.4	0.41	±0.13
353353	29	RIM	Discordant	PB	9.2	±0.35	0.036	±0.01	0.48	±0.09	1.6	±0.2	0.40	±0.06
353353	30	RIM	Lead Loss	PB	12.8	±0.54	b.l.d.		0.28	±0.09	0.9	±0.2	0.22	±0.05
353353	31	RIM	Main Population	PB	8.4	±0.33	0.026	±0.01	0.62	±0.13	1.7	±0.2	0.39	±0.06

Table A1. 3 continued: Zircon geochemistry for Ce, Pr, Nd, Sm and Eu. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	140 Ce		141 Pr		146 Nd		147 Sm		153 Eu	
353353	32	RIM	Lead Loss	PB	11.8	±0.69	0.021	±0.01	0.34	±0.10	0.8	±0.2	0.24	±0.05
353353	33	RIM	Main Population	PB	9.1	±0.43	0.130	±0.04	2.13	±0.53	4.5	±1.1	1.30	±0.38
353353	34	RIM	Main Population	PB	8.4	±0.28	0.037	±0.01	0.70	±0.13	1.8	±0.2	0.47	±0.06
353353	35	RIM	Discordant	PB	10.9	±0.26	0.099	±0.02	1.89	±0.24	4.0	±0.5	0.98	±0.10
353353	36	RIM	Lead Loss	PB	11.5	±0.35	0.246	±0.04	3.24	±0.42	7.9	±0.8	2.60	±0.31
353353	37	RIM	Inherited	PB	18.1	±1.00	0.054	±0.02	0.56	±0.11	1.5	±0.2	0.31	±0.06
353353	38	RIM	Lead Loss	PB	27.3	±1.10	0.032	±0.02	0.68	±0.20	1.8	±0.3	0.48	±0.07
353353	39	RIM	Main Population	PB	11.2	±0.57	0.038	±0.01	0.66	±0.13	1.8	±0.3	0.49	±0.07
353353	40	RIM	Lead Loss	PB	11.1	±0.36	0.071	±0.02	1.28	±0.17	3.4	±0.3	0.76	±0.08
353353	41	RIM	Discordant	PB	10.9	±0.31	0.024	±0.01	0.54	±0.13	1.3	±0.2	0.41	±0.06
353353	42	RIM	Main Population	PB	14.2	±0.36	0.094	±0.02	1.53	±0.22	3.6	±0.4	0.66	±0.09
353353	43	RIM	Main Population	PB	7.8	±0.35	0.042	±0.02	0.98	±0.22	1.8	±0.3	0.54	±0.11
353353	44	RIM	Titanite/Apatite Inclusions	PB	24.1	±1.90	0.440	±0.19	3.00	±1.10	2.1	±0.9	0.59	±0.23
353353	45	RIM	Discordant	PB	10.5	±3.20	0.010	±0.01	0.38	±0.16	0.7	±0.3	0.18	±0.06
353353	46	RIM	Discordant	PB	8.8	±0.30	0.027	±0.01	0.55	±0.10	1.5	±0.2	0.35	±0.05
353353	47	RIM	Main Population	PB	9.0	±0.37	0.096	±0.03	1.04	±0.24	1.6	±0.4	0.39	±0.10
353353	48	RIM	Main Population	PB	10.1	±0.39	0.016	±0.01	0.32	±0.12	1.2	±0.3	0.32	±0.08
353353	49	RIM	Main Population	PB	10.2	±0.37	0.014	±0.01	0.26	±0.07	1.0	±0.1	0.25	±0.04
353355	1	RIM	Main Population	PB	13.0	±0.32	0.009	±0.01	0.38	±0.11	1.1	±0.2	0.16	±0.04
353355	2	RIM	Main Population	PB	8.5	±0.60	0.024	±0.01	0.44	±0.11	1.2	±0.2	0.42	±0.06
353355	3	RIM	Main Population	PB	9.8	±0.93	0.200	±0.04	3.31	±0.47	5.0	±0.6	1.41	±0.18
353355	4	RIM	Lead Loss	PB	12.4	±0.41	0.033	±0.01	0.47	±0.11	1.3	±0.2	0.27	±0.05
353355	5	RIM	Discordant	PB	8.0	±0.26	0.042	±0.01	0.91	±0.14	1.8	±0.2	0.56	±0.07
353355	6	RIM	Discordant	PB	12.1	±0.35	0.081	±0.02	1.89	±0.36	3.9	±0.4	0.99	±0.10
353355	7	RIM	Main Population	PB	7.6	±0.27	0.018	±0.01	0.37	±0.10	1.2	±0.2	0.27	±0.05
353355	8	RIM	Main Population	PB	5.7	±1.70	0.032	±0.02	0.59	±0.24	1.2	±0.4	0.32	±0.12
353355	9	RIM	Inherited	PB	10.9	±0.37	0.088	±0.02	1.91	±0.22	3.9	±0.3	1.01	±0.08
353355	10	RIM	Main Population	PB	10.7	±0.86	0.101	±0.03	1.99	±0.30	4.1	±0.6	1.01	±0.11
353355	10	CORE	Main Population	PB	13.9	±1.90	0.028	±0.02	0.37	±0.19	0.6	±0.3	0.23	±0.08
353355	11	RIM	Main Population	PB	11.8	±0.35	0.051	±0.01	0.95	±0.19	2.9	±0.3	0.82	±0.09
353355	12	RIM	Main Population	PB	11.7	±0.43	0.161	±0.03	3.10	±0.37	5.7	±0.6	1.36	±0.15

Table A1. 3 continued: Zircon geochemistry for Ce, Pr, Nd, Sm and Eu. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	140 Ce		141 Pr		146 Nd		147 Sm		153 Eu	
353355	13	RIM	Main Population	PB	11.4	±0.49	0.073	±0.02	1.65	±0.33	4.0	±0.7	0.88	±0.13
353355	14	CORE	Main Population	PB	7.6	±0.26	0.031	±0.01	0.77	±0.14	1.5	±0.3	0.56	±0.07
353355	14	MID	Main Population	PB	7.5	±0.24	0.025	±0.01	0.55	±0.10	1.5	±0.2	0.49	±0.05
353355	14	MID	Lead Loss	PB	8.0	±0.24	0.019	±0.01	0.37	±0.10	1.2	±0.2	0.37	±0.05
353355	14	RIM	Discordant	PB	9.6	±0.33	0.014	±0.01	0.44	±0.10	1.2	±0.2	0.37	±0.05
353355	15	RIM	Main Population	PB	17.6	±0.59	0.090	±0.03	1.71	±0.35	4.2	±0.6	1.00	±0.14
353355	16	RIM	Main Population	PB	11.3	±0.31	0.015	±0.01	0.30	±0.08	1.3	±0.2	0.38	±0.06
353355	17	RIM	Main Population	PB	8.7	±0.31	0.041	±0.01	0.97	±0.13	2.3	±0.3	0.58	±0.06
353355	18	RIM	Main Population	PB	10.0	±0.41	0.018	±0.01	0.32	±0.11	0.8	±0.2	0.33	±0.06
353355	19	RIM	Lead Loss	PB	8.2	±0.24	0.016	±0.01	0.29	±0.08	0.8	±0.1	0.26	±0.05
353355	20	RIM	Main Population	PB	9.7	±0.23	0.044	±0.01	0.95	±0.15	2.5	±0.3	0.77	±0.08
353355	21	CORE	Inherited	PB	2.9	±0.21	0.072	±0.02	1.24	±0.18	2.4	±0.3	0.58	±0.07
353355	21	RIM	Inherited	PB	2.6	±0.13	0.030	±0.01	0.67	±0.14	1.3	±0.2	0.29	±0.04
353355	22	RIM	Main Population	PB	9.2	±0.24	0.078	±0.02	1.57	±0.23	4.2	±0.4	0.98	±0.10
353355	23	RIM	Inherited	PB	11.7	±0.52	0.226	±0.04	3.83	±0.40	6.6	±0.6	1.69	±0.15
353355	24	RIM	Main Population	PB	17.9	±0.62	0.094	±0.02	1.79	±0.21	5.3	±0.4	0.97	±0.07
353355	25	RIM	Main Population	PB	12.8	±0.62	0.033	±0.02	0.89	±0.17	2.8	±0.4	0.73	±0.11
353355	26	RIM	Inherited	PB	13.1	±0.52	0.018	±0.01	0.61	±0.19	0.8	±0.2	0.29	±0.07
353355	27	RIM	Main Population	PB	18.5	±1.30	0.019	±0.01	0.49	±0.09	1.5	±0.2	0.32	±0.05
353355	28	RIM	Main Population	PB	10.1	±0.44	0.051	±0.02	1.11	±0.21	2.3	±0.3	0.62	±0.08
353355	29	RIM	Main Population	PB	9.9	±0.47	0.009	±0.01	0.26	±0.08	0.9	±0.2	0.28	±0.05
353355	30	RIM	Main Population	PB	10.8	±0.31	b.l.d.		0.36	±0.09	1.2	±0.2	0.32	±0.05
353355	31	RIM	Discordant	PB	14.5	±0.68	0.069	±0.03	0.81	±0.39	1.5	±0.5	0.37	±0.11
353355	32	RIM	Main Population	PB	13.7	±0.59	b.l.d.		0.44	±0.14	1.4	±0.3	0.35	±0.06
353355	33	RIM	Inherited	PB	9.1	±0.32	0.018	±0.01	0.32	±0.09	0.8	±0.2	0.26	±0.05
353355	34	RIM	Main Population	PB	16.2	±1.40	0.080	±0.03	0.93	±0.25	2.3	±0.4	0.72	±0.15
353355	35	RIM	Main Population	PB	10.9	±0.31	0.027	±0.01	0.34	±0.09	1.3	±0.2	0.31	±0.05
353355	36	CORE	Main Population	PB	11.6	±0.53	0.172	±0.04	3.14	±0.42	5.2	±0.5	1.26	±0.15
353355	36	RIM	Main Population	PB	12.7	±0.37	0.016	±0.01	0.29	±0.08	0.9	±0.1	0.15	±0.03
353355	37	RIM	Discordant	PB	14.7	±0.79	0.165	±0.06	2.32	±0.44	6.1	±1.1	1.53	±0.23
353355	38	RIM	Main Population	PB	11.9	±0.41	0.031	±0.01	0.55	±0.11	1.3	±0.2	0.39	±0.05

Table A1. 3 continued: Zircon geochemistry for Ce, Pr, Nd, Sm and Eu. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	140 Ce		141 Pr		146 Nd		147 Sm		153 Eu	
353355	39	RIM	Main Population	PB	13.1	±0.34	0.022	±0.01	0.49	±0.09	1.4	±0.2	0.34	±0.05
353355	40	RIM	Main Population	PB	9.6	±0.25	0.015	±0.01	0.33	±0.08	1.3	±0.2	0.38	±0.06
353355	41	RIM	Main Population	PB	10.8	±0.31	0.048	±0.01	1.46	±0.16	3.5	±0.3	0.84	±0.09
353355	42	RIM	Discordant	PB	10.9	±0.46	0.146	±0.06	0.58	±0.23	2.7	±0.8	0.61	±0.18
353355	43	RIM	Discordant	PB	9.3	±0.33	0.014	±0.01	0.52	±0.11	1.4	±0.2	0.35	±0.05
353355	44	CORE	Main Population	PB	9.0	±0.23	0.074	±0.02	1.48	±0.22	3.7	±0.3	0.99	±0.11
353355	44	RIM	Main Population	PB	10.8	±0.36	0.027	±0.01	0.49	±0.10	1.2	±0.2	0.44	±0.06
353355	45	RIM	Main Population	PB	11.6	±0.33	b.l.d.		0.32	±0.08	1.0	±0.2	0.20	±0.04
353355	46	RIM	Main Population	PB	12.6	±0.45	0.013	±0.01	0.63	±0.12	1.7	±0.2	0.47	±0.06
353355	47	RIM	Main Population	PB	10.7	±0.47	0.015	±0.01	0.43	±0.12	1.2	±0.2	0.34	±0.07
353355	48	RIM	Main Population	PB	11.3	±0.43	0.042	±0.01	0.63	±0.16	2.3	±0.4	0.51	±0.09
353355	49	RIM	Main Population	PB	9.7	±0.39	0.033	±0.02	0.91	±0.21	1.9	±0.3	0.45	±0.08
353355	50	RIM	Main Population	PB	18.9	±0.99	0.030	±0.01	0.66	±0.17	2.0	±0.3	0.38	±0.07
353358	1	RIM	Main Population	PB	17.4	±2.40	0.081	±0.03	1.44	±0.29	3.4	±0.5	0.98	±0.15
353358	2	RIM	Main Population	PB	12.2	±0.42	0.204	±0.03	3.67	±0.38	5.8	±0.5	1.44	±0.12
353358	3	RIM	Main Population	PB	12.7	±0.38	0.137	±0.03	2.18	±0.37	3.4	±0.4	0.74	±0.10
353358	4	RIM	Inherited	PB	12.3	±0.48	0.020	±0.02	0.61	±0.34	1.6	±0.5	0.36	±0.17
353358	5	RIM	Main Population	PB	11.6	±3.90	0.017	±0.01	0.28	±0.11	0.7	±0.3	0.20	±0.07
353358	6	RIM	Main Population	PB	10.4	±0.30	0.020	±0.01	0.47	±0.10	1.4	±0.2	0.37	±0.05
353358	7	RIM	Inherited	PB	11.2	±0.63	0.109	±0.03	2.80	±0.52	4.9	±0.6	1.41	±0.17
353358	8	RIM	Main Population	PB	31.4	±1.20	0.041	±0.01	0.82	±0.17	2.5	±0.3	0.68	±0.08
353358	9	RIM	Main Population	PB	10.9	±2.30	0.158	±0.05	2.67	±0.66	4.7	±1.1	1.30	±0.31
353358	10	RIM	Main Population	PB	20.6	±0.56	0.043	±0.01	0.88	±0.16	2.2	±0.2	0.53	±0.06
353358	11	RIM	Discordant	PB	20.9	±1.20	0.126	±0.02	2.48	±0.27	5.6	±0.4	1.33	±0.13
353358	13	RIM	Main Population	PB	33.5	±0.76	0.053	±0.01	0.81	±0.12	1.7	±0.2	0.58	±0.06
353358	14	RIM	Main Population	PB	10.0	±0.38	0.028	±0.01	0.56	±0.09	1.4	±0.2	0.43	±0.05
353358	15	RIM	Inherited	PB	4.4	±1.10	0.007	±0.00	0.19	±0.06	0.5	±0.2	0.13	±0.04
353358	16	RIM	Inherited	PB	10.9	±0.25	0.042	±0.01	0.40	±0.09	1.3	±0.2	0.35	±0.05
353358	17	RIM	Main Population	PB	10.8	±0.37	0.018	±0.01	0.47	±0.09	1.2	±0.2	0.29	±0.04
353358	18	RIM	Discordant	PB	12.2	±0.37	0.014	±0.01	0.45	±0.09	1.3	±0.2	0.33	±0.05
353358	19	RIM	Main Population	PB	11.3	±0.27	0.032	±0.01	0.69	±0.12	2.0	±0.2	0.47	±0.06

Table A1. 3 continued: Zircon geochemistry for Ce, Pr, Nd, Sm and Eu. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	140 Ce		141 Pr		146 Nd		147 Sm		153 Eu	
353358	20	RIM	Main Population	PB	11.4	±3.40	0.084	±0.03	1.37	±0.49	3.4	±1.2	0.76	±0.26
353358	21	RIM	Main Population	PB	16.0	±0.67	0.121	±0.02	1.97	±0.26	4.1	±0.4	1.11	±0.12
353358	22	RIM	Main Population	PB	14.3	±0.33	0.021	±0.01	0.36	±0.09	1.1	±0.2	0.24	±0.04
353358	23	RIM	Main Population	PB	29.2	±1.70	0.069	±0.02	0.81	±0.15	2.5	±0.3	0.69	±0.09
353358	24	RIM	Main Population	PB	10.6	±0.30	0.107	±0.02	1.61	±0.22	2.9	±0.3	0.87	±0.09
353358	25	RIM	Main Population	PB	8.6	±0.29	b.l.d.		0.37	±0.08	0.8	±0.1	0.27	±0.04
353358	26	RIM	Main Population	PB	34.5	±1.30	0.028	±0.01	0.73	±0.13	2.0	±0.2	0.71	±0.08
353358	27	RIM	Main Population	PB	8.5	±1.40	0.013	±0.01	0.28	±0.08	0.9	±0.2	0.19	±0.05
353358	28	RIM	Main Population	PB	10.8	±0.45	0.018	±0.01	0.57	±0.10	1.5	±0.2	0.33	±0.04
353358	29	RIM	Main Population	PB	25.5	±0.79	0.069	±0.03	1.03	±0.27	2.3	±0.4	0.64	±0.11
353358	30	RIM	Discordant	PB	15.9	±0.28	0.087	±0.02	1.10	±0.15	2.2	±0.3	0.60	±0.07
353358	31	RIM	Main Population	PB	15.4	±0.90	0.081	±0.03	1.32	±0.34	2.7	±0.5	0.65	±0.09
353358	32	RIM	Main Population	PB	14.7	±0.51	0.030	±0.01	0.37	±0.09	1.5	±0.2	0.31	±0.04
353358	33	RIM	Main Population	PB	31.4	±0.91	0.176	±0.04	2.29	±0.30	4.4	±0.5	1.16	±0.15
353358	34	RIM	Titanite/Apatite Inclusions	PB	35.5	±1.30	0.681	±0.08	3.24	±0.38	2.5	±0.3	0.65	±0.06
353358	35	RIM	Main Population	PB	29.2	±1.90	0.039	±0.01	0.77	±0.15	2.0	±0.3	0.63	±0.07
353358	36	CORE	Main Population	PB	9.1	±0.49	0.071	±0.02	1.64	±0.27	3.3	±0.5	0.98	±0.13
353358	36	MID	Main Population	PB	10.3	±0.31	0.036	±0.01	0.66	±0.12	1.9	±0.2	0.56	±0.07
353358	36	RIM	Inherited	PB	10.0	±0.49	0.013	±0.01	0.25	±0.07	0.9	±0.1	0.22	±0.04
353358	37	RIM	Main Population	PB	10.5	±0.30	0.026	±0.01	0.55	±0.10	1.4	±0.2	0.34	±0.05
353358	38	RIM	Main Population	PB	18.8	±4.70	0.013	±0.01	0.39	±0.15	1.0	±0.3	0.34	±0.11
353358	39	RIM	Inherited	PB	9.3	±0.36	0.023	±0.01	0.47	±0.10	1.5	±0.2	0.40	±0.05
353358	40	RIM	Inherited	PB	12.8	±0.29	0.022	±0.01	0.57	±0.09	1.3	±0.2	0.28	±0.04
353358	41	RIM	Main Population	PB	12.2	±0.41	0.184	±0.03	3.01	±0.29	5.0	±0.5	0.91	±0.08
353358	42	RIM	Main Population	PB	14.5	±0.93	0.022	±0.01	0.33	±0.09	0.9	±0.1	0.28	±0.04
353358	43	RIM	Main Population	PB	20.5	±0.57	0.030	±0.02	0.55	±0.17	1.1	±0.2	0.26	±0.06
353358	44	RIM	Main Population	PB	17.1	±2.10	0.039	±0.01	0.63	±0.16	1.5	±0.3	0.44	±0.07
353358	45	CORE	Main Population	PB	8.4	±0.45	0.046	±0.01	0.94	±0.15	2.3	±0.3	0.69	±0.07
353358	45	RIM	Discordant	PB	8.6	±0.41	0.020	±0.01	0.36	±0.08	1.1	±0.2	0.30	±0.04
353358	46	RIM	Lead Loss	PB	32.6	±1.20	0.140	±0.10	1.31	±0.73	2.4	±1.1	1.26	±0.36
353358	47	CORE	Lead Loss	PB	7.3	±0.26	0.086	±0.02	0.46	±0.11	0.6	±0.2	0.17	±0.04

Table A1. 3 continued: Zircon geochemistry for Ce, Pr, Nd, Sm and Eu. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	140 Ce		141 Pr		146 Nd		147 Sm		153 Eu	
353358	47	RIM	Inherited	PB	8.8	±0.36	0.013	±0.01	0.21	±0.07	0.8	±0.1	0.23	±0.04
353358	48	RIM	Main Population	PB	10.9	±0.57	0.023	±0.01	0.39	±0.08	1.4	±0.2	0.44	±0.05
353358	49	RIM	Main Population	PB	46.9	±1.40	0.201	±0.08	1.68	±0.39	3.0	±0.5	0.86	±0.13
353362	1	RIM	Inherited	PS	8.5	±0.31	0.023	±0.01	0.68	±0.13	1.5	±0.3	0.41	±0.06
353362	2	RIM	Main Population	PS	11.3	±0.88	0.089	±0.05	1.24	±0.58	2.1	±0.7	0.75	±0.22
353362	3	RIM	Main Population	PS	11.3	±0.65	b.l.d.		0.67	±0.13	1.4	±0.3	0.55	±0.08
353362	4	RIM	Rejected	PS	7.4	±0.32	0.162	±0.05	1.49	±0.31	2.2	±0.5	0.78	±0.14
353362	5	RIM	Main Population	PS	16.1	±0.75	0.022	±0.01	0.29	±0.08	1.2	±0.2	0.43	±0.06
353362	6	RIM	Main Population	PS	9.2	±0.50	0.015	±0.01	0.49	±0.12	1.3	±0.2	0.46	±0.06
353362	6	CORE	Lead Loss	PS	12.9	±0.67	0.079	±0.03	1.26	±0.31	3.2	±0.6	1.06	±0.19
353362	7	RIM	Inherited	PS	12.5	±1.60	0.104	±0.03	1.12	±0.18	1.9	±0.3	0.54	±0.07
353362	8	RIM	Main Population	PS	6.0	±0.62	0.015	±0.01	0.30	±0.10	0.8	±0.2	0.26	±0.07
353362	9	RIM	Main Population	PS	28.5	±1.20	0.036	±0.01	0.55	±0.10	1.3	±0.2	0.50	±0.07
353362	10	RIM	Main Population	PS	14.5	±0.85	0.080	±0.03	1.16	±0.30	1.9	±0.4	0.91	±0.15
353362	11	RIM	Inherited	PS	7.7	±0.46	0.021	±0.01	0.27	±0.09	0.9	±0.2	0.36	±0.06
353362	12	CORE	Inherited	PS	11.8	±2.10	0.169	±0.05	3.12	±0.77	4.9	±1.1	0.72	±0.17
353362	12	RIM	Inherited	PS	8.6	±0.61	0.018	±0.01	0.36	±0.10	1.1	±0.2	0.30	±0.05
353362	13	RIM	Inherited	PS	12.7	±0.58	0.104	±0.03	2.33	±0.33	4.2	±0.5	1.13	±0.13
353362	14	RIM	Inherited	PS	11.3	±1.00	0.012	±0.01	0.36	±0.10	0.9	±0.2	0.32	±0.05
353362	15	RIM	Main Population	PS	10.5	±0.48	0.023	±0.01	0.63	±0.16	1.7	±0.3	0.64	±0.09
353362	16	RIM	Main Population	PS	8.4	±0.44	0.015	±0.01	0.41	±0.12	0.9	±0.2	0.34	±0.06
353362	17	RIM	Main Population	PS	11.0	±0.53	b.l.d.		0.28	±0.16	0.5	±0.2	0.37	±0.12
353362	18	RIM	Main Population	PS	13.2	±0.49	0.055	±0.03	0.64	±0.21	2.1	±0.6	0.51	±0.13
353362	19	RIM	Main Population	PS	12.2	±0.51	0.026	±0.02	0.60	±0.16	1.2	±0.3	0.53	±0.09
353362	20	CORE	Inherited	PS	8.4	±0.57	0.047	±0.01	0.73	±0.10	1.2	±0.2	0.55	±0.05
353362	20	RIM	Main Population	PS	8.3	±0.55	0.052	±0.02	0.46	±0.15	1.0	±0.2	0.33	±0.08
353362	21	RIM	Main Population	PS	9.4	±0.53	0.044	±0.03	0.75	±0.32	1.2	±0.4	0.40	±0.10
353362	22	CORE	Main Population	PS	9.2	±0.50	0.028	±0.02	0.49		1.2	±0.2	0.44	±0.09
353362	22	RIM	Lead Loss	PS	10.0	±0.54	0.021	±0.01	b.l.d.	±0.15	0.5	±0.3	0.36	±0.08
353362	23	CORE	Main Population	PS	11.7	±1.20	0.072	±0.02	0.95	±0.25	1.7	±0.4	0.56	±0.09
353362	23	RIM	Main Population	PS	10.0	±0.52	0.065	±0.02	0.36	±0.12	0.6	±0.2	0.26	±0.05

Table A1. 3 continued: Zircon geochemistry for Ce, Pr, Nd, Sm and Eu. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	140 Ce		141 Pr		146 Nd		147 Sm		153 Eu	
353362	24	RIM	Main Population	PS	50.6	±3.20	0.840	±0.13	6.54	±0.93	7.0	±0.6	1.74	±0.17
353362	25	RIM	Main Population	PS	9.8	±0.43	0.022	±0.01	0.35	±0.13	0.7	±0.2	0.28	±0.06
353362	26	RIM	Main Population	PS	15.8	±0.68	0.045	±0.03	0.66	±0.22	1.4	±0.4	0.64	±0.10
353362	27	RIM	Main Population	PS	8.8	±0.28	b.l.d.		0.53	±0.10	1.3	±0.2	0.45	±0.07
353362	28	RIM	Main Population	PS	18.2	±1.30	0.250	±0.12	2.70	±1.40	3.7	±1.3	0.80	±0.28
353362	29	RIM	Lead Loss	PS	35.3	±3.30	0.138	±0.04	1.78	±0.44	3.0	±0.7	1.44	±0.29
353362	30	RIM	Inherited	PS	10.2	±1.10	0.014	±0.02	0.41	±0.24	1.4	±0.5	0.39	±0.12
353362	31	RIM	Lead Loss	PS	20.0	±2.60	0.125	±0.06	1.75	±0.47	3.4	±0.7	0.98	±0.19
353362	32	RIM	Discordant	PS	7.8	±0.25	0.042	±0.01	0.73	±0.13	1.8	±0.2	0.55	±0.06
353362	33	RIM	Lead Loss	PS	10.3	±0.46	0.045	±0.01	0.92	±0.14	2.0	±0.3	0.54	±0.07
353362	34	RIM	Inherited	PS	7.9	±0.45	0.029	±0.01	0.35	±0.09	0.7	±0.1	0.30	±0.05
353362	34	CORE	Inherited	PS	43.0	±11.00	0.167	±0.06	2.77	±0.84	4.6	±1.3	1.32	±0.37
353362	35	CORE	Lead Loss	PS	4.1	±1.50	0.023	±0.02	0.49	±0.23	0.9	±0.4	0.40	±0.17
353362	35	RIM	Main Population	PS	14.3	±0.78	b.l.d.		0.27	±0.08	0.7	±0.2	0.30	±0.06
353362	36	RIM	Main Population	PS	8.9	±0.23	0.033	±0.01	0.32	±0.09	0.6	±0.1	0.22	±0.04
353362	37	RIM	Main Population	PS	10.0	±0.38	0.020	±0.01	0.27	±0.09	0.5	±0.1	0.30	±0.05
353362	38	RIM	Rejected	PS	9.0	±0.83	0.081	±0.07	0.57	±0.39	1.1	±0.9	0.44	±0.29
353362	39	RIM	Discordant	PS	13.3	±0.44	0.005	±0.00	0.20	±0.07	0.6	±0.1	0.27	±0.05
353362	40	CORE	Discordant	PS	8.4	±0.23	0.033	±0.01	0.44	±0.12	1.1	±0.2	0.41	±0.06
353362	40	RIM	Main Population	PS	16.5	±0.44	0.010	±0.01	0.22	±0.07	0.7	±0.1	0.29	±0.05
353362	41	RIM	Main Population	PS	8.7	±0.32	0.010	±0.01	0.22	±0.08	0.8	±0.1	0.19	±0.04
353362	41	CORE	Main Population	PS	11.8	±3.40	0.014	±0.01	0.47	±0.19	1.1	±0.4	0.36	±0.13
353362	42	RIM	Discordant	PS	10.7	±0.67	0.093	±0.04	1.80	±0.39	3.2	±0.5	1.25	±0.20
353362	43	RIM	Main Population	PS	9.4	±0.42	0.035	±0.02	0.78	±0.20	2.2	±0.4	0.54	±0.08
353362	44	RIM	Main Population	PS	8.6	±0.29	0.017	±0.01	0.29	±0.07	0.7	±0.1	0.25	±0.04
353362	44	CORE	Lead Loss	PS	15.1	±2.00	0.021	±0.01	0.53	±0.16	1.5	±0.3	0.52	±0.10
353362	46	RIM	Main Population	PS	7.0	±0.26	b.l.d.		0.23	±0.07	0.7	±0.1	0.26	±0.04
353362	48	RIM	Main Population	PS	8.6	±0.31	0.114	±0.03	2.11	±0.29	3.6	±0.4	1.10	±0.12
353362	49	RIM	Main Population	PS	8.2	±0.25	0.036	±0.02	0.53	±0.14	1.6	±0.3	0.45	±0.06
353363	1	CORE	Main Population	PS	6.5	±0.35	0.027	±0.01	0.44	±0.11	0.9	±0.2	0.36	±0.06
353363	1	RIM	Inherited	PS	6.9	±0.39	0.049	±0.03	0.81	±0.25	1.5	±0.4	0.43	±0.12

Table A1. 3 continued: Zircon geochemistry for Ce, Pr, Nd, Sm and Eu. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	140 Ce		141 Pr		146 Nd		147 Sm		153 Eu	
353363	2	RIM	Inherited	PS	11.1	±0.47	0.119	±0.05	2.43	±0.50	2.9	±0.5	0.79	±0.15
353363	3	RIM	Main Population	PS	6.6	±0.27	0.038	±0.02	0.42	±0.15	0.7	±0.2	0.25	±0.06
353363	4	RIM	Main Population	PS	10.4	±0.28	0.089	±0.02	1.92	±0.26	3.9	±0.4	1.11	±0.10
353363	5	RIM	Main Population	PS	9.8	±0.80	0.074	±0.07	0.43	±0.24	1.0	±0.4	0.36	±0.13
353363	6	RIM	Discordant	PS	38.1	±3.10	0.059	±0.02	1.29	±0.28	2.4	±0.4	1.03	±0.16
353363	7	RIM	Inherited	PS	9.6	±0.31	0.361	±0.04	5.27	±0.37	8.5	±0.5	1.16	±0.11
353363	8	RIM	Main Population	PS	20.8	±2.10	0.085	±0.03	0.88	±0.22	2.1	±0.4	0.82	±0.13
353363	9	RIM	Main Population	PS	31.9	±2.10	0.087	±0.03	0.97	±0.23	2.1	±0.3	0.89	±0.15
353363	10	RIM	Main Population	PS	26.6	±1.30	0.115	±0.04	2.19	±0.43	3.0	±0.5	1.15	±0.13
353363	11	RIM	Main Population	PS	30.5	±2.40	0.149	±0.05	2.02	±0.45	3.8	±0.8	1.09	±0.19
353363	12	RIM	Discordant	PS	15.7	±1.20	0.074	±0.04	1.09	±0.36	2.4	±0.6	0.70	±0.20
353363	13	RIM	Main Population	PS	23.8	±0.99	0.047	±0.02	0.78	±0.15	2.0	±0.3	0.66	±0.09
353363	14	RIM	Inherited	PS	11.4	±3.50	0.018	±0.01	0.23	±0.12	0.9	±0.3	0.23	±0.10
353363	15	RIM	Main Population	PS	11.8	±0.75	0.111	±0.04	1.96	±0.41	4.4	±0.9	1.11	±0.18
353363	16	RIM	Discordant	PS	17.2	±0.69	0.034	±0.02	0.90	±0.26	2.4	±0.6	0.84	±0.13
353363	17	RIM	Titanite/Apatite Inclusions	PS	11.1	±0.79	0.098	±0.04	0.93	±0.33	1.2	±0.3	0.47	±0.09
353363	18	RIM	Discordant	PS	14.7	±1.10	0.042	±0.02	0.71	±0.18	1.2	±0.3	0.61	±0.10
353363	19	RIM	Main Population	PS	33.8	±2.70	0.088	±0.03	1.09	±0.27	2.1	±0.4	0.62	±0.13
353363	20	RIM	Main Population	PS	17.8	±2.20	0.056	±0.02	0.57	±0.18	2.0	±0.4	0.57	±0.13
353363	21	RIM	Main Population	PS	23.3	±0.84	0.046	±0.02	0.79	±0.17	1.7	±0.3	0.65	±0.11
353363	22	CORE	Inherited	PS	8.1	±0.56	0.057	±0.02	0.72	±0.15	1.8	±0.3	0.58	±0.08
353363	22	RIM	Main Population	PS	16.4	±0.42	0.018	±0.01	0.44	±0.11	1.1	±0.2	0.37	±0.05
353363	23	RIM	Main Population	PS	21.1	±1.50	0.139	±0.04	1.70	±0.39	2.8	±0.5	0.85	±0.12
353363	25	RIM	Inherited	PS	34.1	±1.30	0.035	±0.01	0.67	±0.14	2.0	±0.3	0.59	±0.06
353363	26	RIM	Rejected	PS	34.0	±6.00	2.060	±0.59	8.40	±2.30	3.4	±0.7	0.91	±0.19
353363	27	RIM	Inherited	PS	16.6	±2.30	0.034	±0.02	0.76	±0.21	1.6	±0.5	0.59	±0.12
353363	28	RIM	Main Population	PS	30.7	±1.90	0.082	±0.03	1.30	±0.25	3.3	±0.5	1.03	±0.13
353363	29	RIM	Discordant	PS	6.9	±0.26	0.033	±0.01	0.23	±0.07	0.6	±0.1	0.23	±0.04
353363	30	RIM	Inherited	PS	33.5	±1.90	0.106	±0.02	1.96	±0.23	4.3	±0.4	1.19	±0.09
353363	31	RIM	Main Population	PS	15.5	±1.70	0.229	±0.05	3.27	±0.66	5.4	±1.1	2.56	±0.46
353363	32	RIM	Discordant	PS	17.7	±2.20	0.157	±0.04	1.55	±0.35	2.8	±0.5	0.92	±0.16

Table A1. 3 continued: Zircon geochemistry for Ce, Pr, Nd, Sm and Eu. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	140 Ce		141 Pr		146 Nd		147 Sm		153 Eu	
353363	33	RIM	Inherited	PS	9.5	±0.86	0.138	±0.06	2.54	±0.51	7.5	±1.1	1.03	±0.25
353363	34	RIM	Main Population	PS	26.2	±1.40	0.070	±0.03	1.02	±0.26	2.3	±0.4	0.73	±0.12
353363	35	RIM	Main Population	PS	15.4	±0.59	0.057	±0.02	0.93	±0.26	1.9	±0.3	0.72	±0.11
353363	36	RIM	Main Population	PS	18.3	±3.10	0.048	±0.02	0.77	±0.25	1.4	±0.4	0.63	±0.13
353363	37	RIM	Main Population	PS	11.4	±1.00	0.036	±0.01	0.53	±0.12	1.4	±0.2	0.45	±0.07
353363	38	RIM	Discordant	PS	10.4	±0.34	0.042	±0.02	0.67	±0.14	1.1	±0.2	0.33	±0.06
353363	39	RIM	Main Population	PS	18.8	±0.90	0.046	±0.02	0.53	±0.13	1.8	±0.3	0.65	±0.09
353363	40	RIM	Titanite/Apatite Inclusions	PS	19.1	±2.60	0.710	±0.39	5.20	±2.20	5.7	±1.9	0.98	±0.28
353363	41	RIM	Main Population	PS	19.5	±3.20	0.040	±0.04	0.68	±0.35	2.3	±0.9	0.52	±0.21
353363	42	RIM	Main Population	PS	12.3	±0.54	0.060	±0.02	0.83	±0.13	1.9	±0.3	0.65	±0.08
353363	43	RIM	Inherited	PS	6.1	±0.27	0.017	±0.01	0.21	±0.07	0.6	±0.1	0.24	±0.05
353363	44	RIM	Inherited	PS	9.2	±0.48	0.064	±0.02	1.27	±0.20	2.6	±0.3	0.82	±0.10
353363	45	RIM	Inherited	PS	15.0	±2.10	b.l.d.		0.90	±1.00	1.5	±1.4	0.42	±0.28
353363	46	RIM	Rejected	PS	22.9	±3.30	0.230	±0.11	1.90	±0.60	3.4	±1.0	1.33	±0.34
353363	47	CORE	Main Population	PS	9.5	±0.30	0.125	±0.02	2.55	±0.26	5.1	±0.4	1.40	±0.09
353363	47	RIM	Main Population	PS	15.6	±0.53	0.043	±0.02	0.62	±0.19	1.3	±0.3	0.45	±0.07
353363	48	RIM	Inherited	PS	8.2	±0.45	0.084	±0.02	1.44	±0.25	2.9	±0.5	0.94	±0.13
353363	49	RIM	Main Population	PS	9.8	±0.41	0.095	±0.02	2.10	±0.28	4.1	±0.4	1.33	±0.13
353368	1	RIM	Main Population	PS	9.4	±0.30	0.011	±0.01	0.30	±0.07	0.8	±0.1	0.35	±0.04
353368	2	RIM	Main Population	PS	9.0	±0.33	0.023	±0.01	0.58	±0.11	1.9	±0.3	0.60	±0.08
353368	3	RIM	Main Population	PS	17.2	±0.50	0.164	±0.03	2.86	±0.30	5.5	±0.5	1.63	±0.15
353368	4	RIM	Main Population	PS	8.5	±0.35	0.016	±0.01	0.35	±0.07	0.9	±0.1	0.35	±0.04
353368	5	CORE	Main Population	PS	6.6	±0.38	0.012	±0.01	0.45	±0.10	1.2	±0.2	0.41	±0.06
353368	5	RIM	Main Population	PS	7.5	±0.27	0.013	±0.01	0.21	±0.07	0.7	±0.1	0.21	±0.04
353368	6	RIM	Main Population	PS	10.6	±2.10	0.014	±0.01	0.34	±0.09	1.0	±0.3	0.40	±0.09
353368	7	RIM	Inherited	PS	13.9	±0.88	0.109	±0.03	1.45	±0.35	4.5	±0.9	2.10	±0.23
353368	8	RIM	Main Population	PS	10.6	±0.30	0.116	±0.04	1.81	±0.30	3.5	±0.5	0.91	±0.11
353368	9	RIM	Inherited	PS	8.1	±0.34	0.027	±0.01	0.46	±0.10	1.4	±0.2	0.39	±0.06
353368	10	RIM	Main Population	PS	8.4	±0.23	0.020	±0.01	0.27	±0.07	0.7	±0.1	0.29	±0.04
353368	10	CORE	Inherited	PS	10.7	±0.34	0.045	±0.03	1.36	±0.31	2.7	±0.5	0.64	±0.12
353368	11	RIM	Main Population	PS	10.7	±0.36	0.038	±0.02	0.79	±0.21	1.7	±0.3	0.53	±0.09

Table A1. 3 continued: Zircon geochemistry for Ce, Pr, Nd, Sm and Eu. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	140 Ce		141 Pr		146 Nd		147 Sm		153 Eu	
353368	12	RIM	Main Population	PS	9.5	±0.42	0.044	±0.01	0.53	±0.10	1.1	±0.2	0.40	±0.05
353368	13	RIM	Inherited	PS	13.0	±1.10	0.168	±0.03	3.03	±0.37	5.8	±0.7	1.77	±0.22
353368	14	RIM	Main Population	PS	8.2	±0.23	0.057	±0.01	1.15	±0.17	2.4	±0.3	0.77	±0.07
353368	15	RIM	Discordant	PS	9.6	±0.38	0.046	±0.02	0.49	±0.11	1.5	±0.3	0.50	±0.07
353368	16	RIM	Main Population	PS	8.7	±0.35	0.018	±0.01	0.50	±0.15	1.1	±0.3	0.41	±0.09
353368	17	RIM	Main Population	PS	8.2	±0.36	0.025	±0.01	0.41	±0.10	1.1	±0.2	0.39	±0.06
353368	18	RIM	Main Population	PS	10.9	±0.44	0.077	±0.02	1.51	±0.23	3.3	±0.4	0.89	±0.09
353368	19	RIM	Main Population	PS	9.8	±2.80	0.033	±0.01	0.52	±0.19	1.6	±0.5	0.54	±0.17
353368	20	RIM	Main Population	PS	4.6	±2.20	0.012	±0.01	0.20	±0.14	0.5	±0.3	0.23	±0.12
353368	22	RIM	Discordant	PS	11.0	±0.76	0.037	±0.01	0.35	±0.08	1.1	±0.2	0.36	±0.05
353368	23	RIM	Main Population	PS	8.9	±0.87	0.039	±0.01	0.80	±0.15	2.0	±0.3	0.61	±0.08
353368	24	RIM	Main Population	PS	10.2	±0.45	0.127	±0.03	2.38	±0.30	4.8	±0.5	1.41	±0.14
353368	25	RIM	Inherited	PS	7.6	±0.90	0.029	±0.01	0.36	±0.10	0.7	±0.2	0.25	±0.06
353368	26	RIM	Main Population	PS	8.2	±0.28	0.008	±0.01	0.26	±0.07	0.8	±0.1	0.30	±0.05
353368	27	RIM	Main Population	PS	19.1	±0.94	0.310	±0.04	4.89	±0.37	9.2	±0.7	3.04	±0.19
353368	28	RIM	Main Population	PS	6.8	±0.20	0.013	±0.01	0.33	±0.08	0.8	±0.1	0.30	±0.04
353368	29	RIM	Lead Loss	PS	17.2	±0.83	0.167	±0.03	3.02	±0.30	5.7	±0.4	1.69	±0.15
353368	30	RIM	Main Population	PS	4.6	±1.60	0.008	±0.01	0.17	±0.08	0.5	±0.2	0.20	±0.09
353368	31	RIM	Main Population	PS	7.7	±0.25	0.028	±0.01	0.58	±0.11	1.5	±0.2	0.47	±0.06
353368	32	RIM	Main Population	PS	42.0	±0.76	0.050	±0.02	0.98	±0.25	2.5	±0.4	0.88	±0.14
353368	33	RIM	Inherited	PS	10.2	±0.70	0.156	±0.03	2.00	±0.27	3.5	±0.5	1.01	±0.14
353368	34	RIM	Main Population	PS	10.0	±0.69	0.097	±0.02	1.77	±0.35	3.7	±0.6	1.09	±0.14
353368	35	RIM	Main Population	PS	13.3	±0.37	0.018	±0.01	0.39	±0.09	0.8	±0.1	0.32	±0.05
353368	36	RIM	Main Population	PS	5.2	±1.20	0.013	±0.01	0.12	±0.05	0.4	±0.1	0.16	±0.05
353368	37	RIM	Main Population	PS	6.8	±0.21	0.013	±0.01	0.25	±0.09	1.0	±0.2	0.29	±0.05
353368	38	RIM	Inherited	PS	12.4	±0.90	b.l.d.		0.31	±0.07	1.1	±0.2	0.41	±0.06
353368	39	RIM	Inherited	PS	11.7	±0.74	0.058	±0.01	0.80	±0.13	2.0	±0.2	0.69	±0.08
353368	40	RIM	Main Population	PS	8.0	±0.20	0.012	±0.01	0.24	±0.06	0.5	±0.1	0.26	±0.04
353368	41	RIM	Main Population	PS	10.8	±0.56	0.068	±0.02	1.69	±0.25	3.6	±0.4	1.03	±0.13
353368	42	RIM	Main Population	PS	7.8	±0.21	0.008	±0.00	0.33	±0.08	0.7	±0.1	0.30	±0.05
353368	43	RIM	Discordant	PS	13.4	±0.68	0.246	±0.04	3.76	±0.34	6.6	±0.5	1.97	±0.15

Table A1. 3 continued: Zircon geochemistry for Ce, Pr, Nd, Sm and Eu. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	140 Ce		141 Pr		146 Nd		147 Sm		153 Eu	
353368	44	RIM	Main Population	PS	17.7	±0.48	0.292	±0.05	4.52	±0.59	7.1	±0.9	2.16	±0.19
353368	45	RIM	Main Population	PS	11.8	±0.57	0.030	±0.01	0.98	±0.16	2.0	±0.3	0.72	±0.09
353368	46	RIM	Main Population	PS	12.1	±0.52	0.222	±0.06	2.76	±0.47	5.0	±0.7	1.47	±0.22
353368	48	RIM	Main Population	PS	10.0	±0.33	0.126	±0.02	2.34	±0.25	5.0	±0.5	1.42	±0.13
353368	49	RIM	Main Population	PS	6.6	±1.30	0.043	±0.02	0.39	±0.12	0.8	±0.2	0.30	±0.08
353369	1	RIM	Main Population	PS	15.9	±1.10	0.071	±0.06	0.87	±0.36	1.9	±0.7	0.73	±0.17
353369	2	RIM	Main Population	PS	7.0	±0.30	0.010	±0.01	0.16	±0.06	0.5	±0.1	0.22	±0.05
353369	2	CORE	Main Population	PS	29.9	±2.40	0.062	±0.02	1.07	±0.15	2.4	±0.3	0.79	±0.07
353369	3	RIM	Main Population	PS	15.2	±0.34	0.025	±0.01	0.39	±0.12	0.9	±0.2	0.43	±0.09
353369	4	RIM	Main Population	PS	18.4	±4.40	0.036	±0.01	0.48	±0.16	1.0	±0.3	0.39	±0.11
353369	5	RIM	Inherited	PS	9.5	±0.30	0.034	±0.01	0.52	±0.12	1.4	±0.2	0.41	±0.06
353369	6	RIM	Main Population	PS	9.3	±0.30	0.016	±0.01	0.44	±0.10	1.0	±0.2	0.39	±0.06
353369	7	RIM	Main Population	PS	12.9	±0.36	0.197	±0.03	3.42	±0.29	6.7	±0.4	1.60	±0.12
353369	8	RIM	Main Population	PS	9.0	±0.31	0.022	±0.01	0.54	±0.11	1.2	±0.2	0.45	±0.06
353369	9	RIM	Inherited	PS	6.8	±0.35	0.012	±0.01	0.24	±0.07	0.9	±0.1	0.28	±0.04
353369	10	RIM	Main Population	PS	8.6	±0.32	0.019	±0.01	0.19	±0.06	0.6	±0.1	0.27	±0.04
353369	11	RIM	Lead Loss	PS	15.7	±0.73	0.093	±0.03	0.66	±0.17	0.9	±0.2	0.26	±0.06
353369	11	CORE	Main Population	PS	15.5	±0.99	0.203	±0.05	2.50	±0.53	4.3	±0.7	1.78	±0.29
353369	12	RIM	Main Population	PS	6.9	±0.34	0.016	±0.01	0.28	±0.07	0.8	±0.1	0.30	±0.04
353369	13	RIM	Inherited	PS	13.5	±1.30	0.034	±0.02	0.70	±0.19	1.4	±0.3	0.49	±0.10
353369	14	RIM	Inherited	PS	8.4	±0.37	0.020	±0.01	0.43	±0.09	1.0	±0.2	0.34	±0.05
353369	15	RIM	Main Population	PS	10.7	±0.41	0.006	±0.00	0.22	±0.07	0.7	±0.1	0.31	±0.04
353369	16	RIM	Main Population	PS	8.6	±0.26	0.019	±0.01	0.35	±0.09	1.0	±0.2	0.30	±0.04
353369	17	RIM	Main Population	PS	15.7	±2.50	0.035	±0.01	0.58	±0.12	1.6	±0.3	0.32	±0.05
353369	18	RIM	Main Population	PS	7.4	±0.23	0.029	±0.01	0.38	±0.09	1.1	±0.2	0.46	±0.06
353369	19	RIM	Lead Loss	PS	10.8	±0.40	0.043	±0.02	0.64	±0.13	1.8	±0.2	0.78	±0.10
353369	20	RIM	Main Population	PS	11.7	±0.36	0.040	±0.01	0.65	±0.13	1.4	±0.2	0.60	±0.07
353369	21	RIM	Titanite/Apatite Inclusions	PS	163.0	±47.00	17.200	±5.50	65.00	±20.00	10.4	±3.1	1.50	±0.44
353369	22	RIM	Main Population	PS	14.1	±0.32	0.023	±0.01	0.55	±0.09	1.2	±0.2	0.50	±0.06
353369	23	RIM	Main Population	PS	11.6	±0.38	0.008	±0.01	0.25	±0.09	0.9	±0.2	0.29	±0.05
353369	24	RIM	Main Population	PS	10.3	±0.26	0.015	±0.01	0.20	±0.07	0.5	±0.1	0.21	±0.04

Table A1. 3 continued: Zircon geochemistry for Ce, Pr, Nd, Sm and Eu. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	140 Ce		141 Pr		146 Nd		147 Sm		153 Eu	
353369	25	RIM	Main Population	PS	13.4	±0.49	0.017	±0.01	0.25	±0.07	0.7	±0.1	0.28	±0.05
353369	26	RIM	Main Population	PS	6.9	±0.26	b.l.d.		0.29	±0.08	0.9	±0.2	0.33	±0.05
353369	27	RIM	Inherited	PS	10.4	±0.33	0.027	±0.01	0.58	±0.13	1.4	±0.2	0.46	±0.06
353369	28	RIM	Main Population	PS	9.6	±0.37	0.012	±0.01	0.14	±0.05	0.7	±0.2	0.27	±0.04
353369	29	RIM	Main Population	PS	10.4	±0.42	0.043	±0.01	0.77	±0.13	1.9	±0.2	0.70	±0.08
353369	30	RIM	Main Population	PS	11.9	±0.57	0.029	±0.01	0.65	±0.13	1.2	±0.2	0.44	±0.06
353369	31	RIM	Main Population	PS	10.5	±0.36	0.050	±0.02	0.30	±0.14	0.5	±0.2	0.24	±0.07
353369	32	RIM	Main Population	PS	57.7	±3.50	0.224	±0.07	2.52	±0.46	5.8	±0.8	0.81	±0.14
353369	33	RIM	Main Population	PS	13.0	±2.00	0.073	±0.04	0.90	±0.54	2.1	±0.7	0.35	±0.25
353369	34	RIM	Main Population	PS	8.6	±0.32	0.018	±0.01	0.13	±0.06	0.6	±0.1	0.22	±0.04
353369	35	RIM	Main Population	PS	6.9	±0.37	b.l.d.		0.25	±0.07	0.6	±0.1	0.21	±0.04
353369	36	RIM	Inherited	PS	20.1	±0.94	0.106	±0.03	1.35	±0.34	3.0	±0.5	0.75	±0.12
353369	37	RIM	Main Population	PS	12.2	±0.33	0.096	±0.03	1.04	±0.22	2.2	±0.3	0.64	±0.09
353369	38	RIM	Inherited	PS	10.9	±2.30	0.047	±0.02	0.51	±0.15	1.1	±0.3	0.32	±0.09
353369	39	RIM	Titanite/Apatite Inclusions	PS	39.5	±5.10	2.720	±0.73	11.90	±2.90	5.4	±0.9	0.75	±0.12
353369	40	RIM	Main Population	PS	7.8	±2.00	0.024	±0.01	0.49	±0.16	0.9	±0.3	0.41	±0.11
353369	41	RIM	Main Population	PS	15.0	±0.79	0.055	±0.02	1.23	±0.24	2.7	±0.4	0.89	±0.13
353369	42	RIM	Discordant	PS	4.9	±1.50	0.006	±0.00	0.29	±0.13	0.6	±0.2	0.21	±0.08
353369	43	RIM	Main Population	PS	4.6	±1.40	0.013	±0.01	0.32	±0.15	0.7	±0.3	0.28	±0.10
353369	44	RIM	Main Population	PS	9.6	±0.28	0.013	±0.01	0.23	±0.07	0.7	±0.1	0.25	±0.03
353369	45	RIM	Main Population	PS	10.7	±0.29	0.029	±0.01	0.48	±0.10	1.2	±0.2	0.60	±0.07
353369	46	RIM	Main Population	PS	9.2	±0.23	0.026	±0.01	0.52	±0.10	1.0	±0.2	0.45	±0.05
353369	47	RIM	Main Population	PS	6.0	±1.10	0.019	±0.01	0.20	±0.07	0.4	±0.1	0.14	±0.04
353369	48	RIM	Inherited	PS	9.2	±0.29	0.011	±0.01	0.34	±0.08	0.9	±0.2	0.36	±0.05
353369	49	RIM	Discordant	PS	11.8	±0.41	0.024	±0.01	0.45	±0.14	0.9	±0.2	0.30	±0.07
353369	50	RIM	Discordant	PS	7.9	±0.23	0.020	±0.01	0.44	±0.10	1.2	±0.2	0.41	±0.05
353369	51	RIM	Main Population	PS	47.0	±0.82	0.069	±0.02	1.22	±0.15	2.9	±0.3	0.86	±0.07
353381	1	RIM	Discordant	UR	19.8	±1.50	b.l.d.		0.14	±0.11	0.8	±0.3	0.30	±0.11
353381	2	RIM	Lead Loss	UR	78.7	±2.10	0.106	±0.02	1.83	±0.24	4.2	±0.4	0.90	±0.09
353381	3	RIM	Lead Loss	UR	51.9	±1.70	0.136	±0.04	2.11	±0.42	3.0	±0.6	1.08	±0.17
353381	4	RIM	Main Population	UR	29.7	±1.70	0.181	±0.05	3.62	±0.67	5.6	±0.8	1.76	±0.26

Table A1. 3 continued: Zircon geochemistry for Ce, Pr, Nd, Sm and Eu. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	140 Ce		141 Pr		146 Nd		147 Sm		153 Eu	
353381	5	RIM	Main Population	UR	34.4	±1.00	0.048	±0.03	1.01	±0.38	2.4	±0.5	0.83	±0.13
353381	6	RIM	Main Population	UR	35.8	±3.10	0.041	±0.03	0.73	±0.35	1.9	±0.6	0.65	±0.15
353381	7	RIM	Inherited	UR	17.2	±1.40	0.025	±0.01	0.51	±0.15	1.3	±0.2	0.48	±0.09
353381	8	RIM	Main Population	UR	48.4	±2.40	0.176	±0.05	2.86	±0.45	4.7	±0.6	1.38	±0.18
353381	9	RIM	Titanite/Apatite Inclusions	UR	110.0	±15.00	8.700	±2.00	38.70	±8.60	10.7	±1.4	1.72	±0.22
353381	10	CORE	Main Population	UR	14.0	±0.39	0.142	±0.03	1.95	±0.29	3.9	±0.4	1.63	±0.16
353381	10	RIM	Inherited	UR	17.4	±6.50	0.008	±0.01	0.24	±0.11	0.5	±0.2	0.18	±0.08
353381	11	RIM	Inherited	UR	6.1	±0.22	0.127	±0.02	2.05	±0.24	3.9	±0.3	0.85	±0.09
353381	12	RIM	Inherited	UR	14.2	±0.77	0.067	±0.03	1.15	±0.33	2.5	±0.5	0.43	±0.11
353381	13	RIM	Titanite/Apatite Inclusions	UR	26.0	±15.00	b.l.d.		b.l.d.		0.3	±4.1	b.l.d.	
353381	14	RIM	Main Population	UR	42.8	±3.00	0.186	±0.05	2.81	±0.60	5.7	±0.7	1.38	±0.26
353381	15	RIM	Main Population	UR	46.9	±1.30	0.073	±0.02	1.87	±0.25	3.9	±0.4	1.28	±0.13
353381	16	CORE	Inherited	UR	35.0	±1.90	0.237	±0.05	4.22	±0.57	7.6	±0.9	3.00	±0.34
353381	16	RIM	Main Population	UR	31.5	±7.20	0.033	±0.02	0.58	±0.20	1.4	±0.4	0.41	±0.12
353381	17	RIM	Inherited	UR	48.0	±2.30	0.865	±0.10	12.30	±1.10	16.7	±1.2	7.53	±0.53
353381	18	RIM	Inherited	UR	41.9	±3.20	0.056	±0.02	1.18	±0.25	3.7	±0.5	0.89	±0.12
353381	18	RIM	Main Population	UR	54.5	±3.40	0.111	±0.04	2.10	±0.36	5.3	±0.6	1.31	±0.19
353381	19	RIM	Lead Loss	UR	73.2	±1.80	0.047	±0.03	1.07	±0.33	3.1	±0.6	0.81	±0.14
353381	20	RIM	Inherited	UR	41.9	±3.00	0.106	±0.05	1.38	±0.39	3.6	±0.9	1.12	±0.21
353381	21	RIM	Main Population	UR	39.3	±1.50	0.049	±0.03	0.93	±0.26	2.2	±0.4	0.59	±0.11
353381	23	RIM	Lead Loss	UR	58.1	±1.90	0.206	±0.06	3.10	±0.54	6.1	±1.1	1.84	±0.28
353381	24	RIM	Main Population	UR	77.8	±1.90	0.259	±0.03	4.72	±0.43	9.4	±0.6	4.76	±0.23
353381	25	RIM	Lead Loss	UR	66.8	±2.40	0.280	±0.12	1.82	±0.46	3.3	±0.5	0.87	±0.11
353381	26	RIM	Lead Loss	UR	76.1	±3.20	0.039	±0.03	1.00	±0.47	4.0	±0.7	0.81	±0.18
353381	27	RIM	Main Population	UR	22.0	±2.00	0.115	±0.06	1.50	±0.57	3.4	±0.7	1.02	±0.22
353381	28	RIM	Main Population	UR	48.5	±1.80	0.067	±0.03	1.57	±0.35	4.8	±0.7	1.15	±0.14
353381	29	RIM	Main Population	UR	26.4	±1.70	0.115	±0.04	2.32	±0.52	4.3	±0.8	1.11	±0.18
353381	30	RIM	Lead Loss	UR	39.0	±2.10	0.061	±0.02	1.41	±0.27	3.2	±0.4	0.91	±0.09
353381	31	RIM	Discordant	UR	31.3	±1.40	0.143	±0.06	1.75	±0.35	3.1	±0.6	0.82	±0.14
353381	32	RIM	Lead Loss	UR	30.2	±3.20	0.146	±0.09	1.14	±0.47	4.1	±1.2	0.47	±0.19
353381	33	RIM	Inherited	UR	26.5	±1.40	0.035	±0.02	0.42	±0.14	1.0	±0.2	0.37	±0.09

Table A1. 3 continued: Zircon geochemistry for Ce, Pr, Nd, Sm and Eu. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	140 Ce		141 Pr		146 Nd		147 Sm		153 Eu	
353381	33	RIM	Main Population	UR	43.6	±2.60	0.053	±0.02	1.13	±0.28	3.0	±0.6	0.91	±0.17
353381	34	RIM	Rejected	UR	28.0	±4.50	0.117	±0.10	1.29	±0.74	2.5	±0.8	1.05	±0.29
353381	35	RIM	Main Population	UR	45.6	±5.20	0.079	±0.04	1.47	±0.53	4.2	±0.9	1.01	±0.26
353381	36	RIM	Main Population	UR	61.9	±4.00	0.720	±0.11	11.60	±1.40	17.7	±2.0	9.01	±0.87
353381	37	RIM	Discordant	UR	33.8	±2.90	0.142	±0.08	2.20	±1.10	4.6	±1.8	1.34	±0.34
353381	38	RIM	Main Population	UR	24.0	±0.89	0.026	±0.02	0.38	±0.16	1.1	±0.3	0.53	±0.09
353381	39	RIM	Inherited	UR	27.9	±1.10	0.075	±0.05	1.13	±0.33	1.7	±0.4	0.97	±0.24
353381	40	RIM	Lead Loss	UR	36.7	±1.20	0.044	±0.01	0.72	±0.13	2.0	±0.2	0.59	±0.07
353381	41	RIM	Main Population	UR	73.8	±6.60	0.259	±0.05	3.37	±0.57	6.2	±0.9	1.97	±0.25
353381	42	RIM	Rejected	UR	195.0	±27.00	18.400	±3.40	68.00	±12.00	12.3	±1.9	1.86	±0.31
353381	42	RIM	Main Population	UR	61.7	±1.50	0.033	±0.02	0.96	±0.21	3.2	±0.7	0.83	±0.15
353381	43	RIM	Rejected	UR	32.4	±4.40	b.l.d.		0.54	±0.67	1.4	±1.1	0.27	±0.24
353381	44	RIM	Main Population	UR	34.5	±0.80	0.190	±0.03	3.01	±0.28	5.5	±0.4	3.08	±0.15
353381	45	RIM	Discordant	UR	42.3	±2.40	0.105	±0.06	1.71	±0.50	2.6	±0.8	1.22	±0.29
353381	46	RIM	Inherited	UR	21.1	±7.00	0.050	±0.03	0.67	±0.31	1.5	±0.6	0.45	±0.17
353381	47	RIM	Main Population	UR	40.1	±2.40	0.152	±0.04	1.69	±0.34	4.1	±0.7	0.95	±0.14
353381	48	RIM	Inherited	UR	45.5	±4.90	0.044	±0.02	0.99	±0.24	3.4	±0.5	0.80	±0.14
353381	49	RIM	Lead Loss	UR	33.0	±0.81	0.099	±0.03	1.18	±0.23	2.7	±0.4	0.75	±0.10
353384	1	RIM	Inherited	PB	10.5	±0.39	0.303	±0.04	3.90	±0.35	6.2	±0.4	1.11	±0.11
353384	2	RIM	Titanite/Apatite Inclusions	PB	10.1	±0.81	0.238	±0.08	2.73	±0.50	4.4	±0.8	0.90	±0.16
353384	3	RIM	Inherited	PB	13.1	±0.96	0.087	±0.03	1.54	±0.30	2.8	±0.4	0.85	±0.12
353384	4	RIM	Main Population	PB	164.0	±19.00	1.250	±0.21	19.40	±3.00	42.4	±4.5	2.84	±0.42
353384	5	RIM	Main Population	PB	9.9	±0.30	0.208	±0.04	3.11	±0.38	5.9	±0.6	1.07	±0.13
353384	6	RIM	Inherited	PB	13.9	±1.30	0.071	±0.03	0.80	±0.28	1.2	±0.4	0.49	±0.11
353384	7	RIM	Inherited	PB	14.7	±0.69	0.234	±0.06	4.66	±0.67	7.0	±1.0	1.79	±0.22
353384	8	RIM	Discordant	PB	61.7	±2.60	0.340	±0.17	6.40	±1.50	12.7	±2.4	1.33	±0.29
353384	9	RIM	Inherited	PB	18.3	±0.53	0.067	±0.02	1.46	±0.29	4.5	±0.6	0.59	±0.11
353384	10	RIM	Lead Loss	PB	16.6	±1.10	0.470	±0.14	3.46	±0.85	4.3	±0.8	0.48	±0.15
353384	11	RIM	Inherited	PB	9.7	±0.33	0.046	±0.01	0.76	±0.13	1.5	±0.2	0.46	±0.06
353384	12	RIM	Main Population	PB	15.6	±0.60	0.267	±0.07	3.92	±0.69	9.7	±1.2	1.56	±0.24
353384	13	RIM	Discordant	PB	11.1	±0.36	0.353	±0.04	5.42	±0.35	7.7	±0.5	1.29	±0.11

Table A1. 3 continued: Zircon geochemistry for Ce, Pr, Nd, Sm and Eu. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	140 Ce		141 Pr		146 Nd		147 Sm		153 Eu	
353384	13	CORE	Main Population	PB	10.7	±0.32	0.322	±0.04	4.67	±0.34	7.3	±0.4	1.39	±0.11
353384	14	RIM	Discordant	PB	10.0	±0.48	0.040	±0.02	0.91	±0.23	1.8	±0.3	0.36	±0.07
353384	15	RIM	Main Population	PB	13.8	±0.46	0.218	±0.06	4.17	±0.60	7.5	±0.9	1.24	±0.19
353384	16	RIM	Main Population	PB	11.2	±0.51	0.057	±0.02	0.66	±0.17	1.7	±0.3	0.32	±0.06
353384	17	RIM	Lead Loss	PB	9.4	±0.47	0.138	±0.03	2.68	±0.42	5.0	±0.7	1.03	±0.14
353384	18	RIM	Inherited	PB	12.4	±0.87	0.158	±0.07	2.31	±0.55	4.0	±0.8	1.15	±0.28
353384	19	RIM	Discordant	PB	8.0	±0.47	0.068	±0.02	1.12	±0.24	2.6	±0.5	0.48	±0.10
353384	20	RIM	Inherited	PB	14.6	±2.00	0.187	±0.05	3.85	±0.95	6.3	±1.5	1.91	±0.40
353385	1	RIM	Inherited	UR	11.0	±0.56	0.034	±0.01	0.68	±0.12	1.7	±0.3	0.42	±0.06
353385	2	RIM	Main Population	UR	64.6	±0.97	0.284	±0.05	5.94	±0.64	16.9	±0.8	8.94	±0.28
353385	3	RIM	Discordant	UR	3.5	±0.85	0.009	±0.01	0.24	±0.09	0.4	±0.1	0.17	±0.05
353385	4	RIM	Inherited	UR	8.0	±0.65	0.024	±0.02	0.39	±0.13	0.6	±0.2	0.21	±0.07
353385	5	RIM	Inherited	UR	18.1	±2.60	0.280	±0.06	5.25	±0.93	9.0	±1.7	2.62	±0.44
353385	6	RIM	Inherited	UR	18.3	±1.20	0.079	±0.02	1.09	±0.17	3.0	±0.3	1.04	±0.11
353385	7	RIM	Inherited	UR	10.4	±0.57	0.189	±0.06	2.42	±0.34	4.4	±0.7	1.28	±0.16
353385	8	RIM	Discordant	UR	160.0	±11.00	2.780	±0.31	43.70	±4.20	67.3	±6.6	26.30	±1.80
353385	9	RIM	Inherited	UR	45.5	±4.40	0.648	±0.07	10.30	±1.10	17.0	±1.9	7.74	±0.82
353385	10	RIM	Main Population	UR	53.9	±1.80	0.794	±0.06	12.05	±0.71	20.3	±1.1	7.31	±0.44
353385	11	RIM	Inherited	UR	8.5	±0.31	0.024	±0.01	0.42	±0.10	1.1	±0.2	0.36	±0.05
353385	12	RIM	Rejected	UR	25.9	±1.40	1.930	±0.13	10.09	±0.80	7.3	±0.8	1.90	±0.21
353385	12	RIM	Inherited	UR	6.6	±0.75	0.015	±0.01	0.39	±0.10	0.9	±0.2	0.36	±0.06
353385	13	RIM	Inherited	UR	9.9	±0.36	0.040	±0.01	0.74	±0.14	1.9	±0.3	0.56	±0.07
353385	14	RIM	Inherited	UR	14.0	±2.30	0.221	±0.07	3.29	±0.89	5.9	±1.6	1.61	±0.44
353385	15	RIM	Lead Loss	UR	66.0	±16.00	0.790	±0.20	12.20	±2.90	16.6	±4.0	7.50	±1.80
353385	16	RIM	Inherited	UR	9.0	±0.83	0.099	±0.03	1.92	±0.41	3.9	±0.7	1.26	±0.23
353385	17	RIM	Inherited	UR	3.3	±0.92	0.013	±0.01	0.38	±0.16	0.7	±0.3	0.25	±0.09
353385	18	RIM	Inherited	UR	2.5	±0.68	0.002	±0.00	0.06	±0.03	0.2	±0.1	0.07	±0.02
353385	19	RIM	Inherited	UR	14.8	±0.53	0.346	±0.05	4.71	±0.48	7.2	±0.6	2.24	±0.22
353385	20	RIM	Main Population	UR	26.6	±0.97	0.072	±0.03	1.46	±0.34	2.9	±0.5	1.40	±0.17
353385	21	RIM	Inherited	UR	9.9	±0.35	0.023	±0.01	0.60	±0.15	1.4	±0.3	0.41	±0.06
353385	22	RIM	Main Population	UR	113.2	±2.70	1.065	±0.07	18.26	±0.85	35.9	±1.1	15.18	±0.41

Table A1. 3 continued: Zircon geochemistry for Ce, Pr, Nd, Sm and Eu. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	140 Ce		141 Pr		146 Nd		147 Sm		153 Eu	
353385	23	RIM	Inherited	UR	9.4	±0.68	0.071	±0.04	0.69	±0.34	1.0	±0.3	0.32	±0.11
353385	24	RIM	Main Population	UR	34.8	±2.30	0.061	±0.02	1.01	±0.18	2.5	±0.3	0.83	±0.10
353385	25	RIM	Inherited	UR	14.6	±1.60	0.410	±0.11	4.77	±0.78	8.3	±1.4	2.99	±0.45
353385	26	RIM	Inherited	UR	2.9	±0.78	0.009	±0.01	0.21	±0.08	0.5	±0.2	0.20	±0.06
353385	27	CORE	Inherited	UR	13.8	±0.69	0.134	±0.04	2.62	±0.33	4.8	±0.5	1.12	±0.12
353385	27	RIM	Inherited	UR	13.0	±0.53	0.035	±0.02	0.85	±0.25	1.6	±0.4	0.36	±0.08
353385	28	RIM	Inherited	UR	10.6	±0.57	0.113	±0.03	2.33	±0.32	3.8	±0.5	1.13	±0.14
353385	29	RIM	Main Population	UR	32.0	±1.10	0.109	±0.04	1.93	±0.37	3.6	±0.6	1.09	±0.15
353385	30	RIM	Main Population	UR	27.6	±0.85	0.042	±0.01	0.82	±0.13	2.2	±0.2	0.70	±0.07
353385	30	CORE	Inherited	UR	46.0	±18.00	0.570	±0.23	8.60	±3.40	13.2	±5.2	4.30	±1.70
353385	31	CORE	Inherited	UR	10.4	±0.56	0.109	±0.03	1.62	±0.33	2.6	±0.5	0.85	±0.14
353385	31	RIM	Inherited	UR	11.8	±0.68	0.107	±0.03	2.13	±0.35	3.9	±0.6	1.17	±0.16
353385	32	RIM	Rejected	UR	34.6	±3.00	2.120	±0.33	8.80	±1.20	4.2	±0.4	1.00	±0.09
353385	33	RIM	Inherited	UR	10.3	±0.42	0.043	±0.01	1.05	±0.15	2.4	±0.3	0.79	±0.07
353385	33	CORE	Lead Loss	UR	11.3	±0.69	0.064	±0.02	0.63	±0.13	1.0	±0.2	0.31	±0.05
353385	34	RIM	Main Population	UR	37.3	±3.30	0.605	±0.07	8.44	±0.79	13.8	±1.4	6.29	±0.69
353388	1	RIM	Main Population	PB	16.8	±1.50	0.091	±0.03	1.43	±0.22	3.6	±0.4	0.71	±0.06
353388	2	RIM	Main Population	PB	11.3	±0.33	0.024	±0.01	0.64	±0.11	1.6	±0.2	0.33	±0.05
353388	3	RIM	Main Population	PB	9.0	±0.52	0.068	±0.02	1.48	±0.37	3.1	±0.6	0.63	±0.11
353388	4	RIM	Main Population	PB	9.7	±0.33	0.137	±0.03	1.71	±0.20	3.5	±0.4	0.95	±0.09
353388	5	RIM	Main Population	PB	11.2	±0.53	0.071	±0.02	0.83	±0.16	2.0	±0.4	0.53	±0.08
353388	6	RIM	Inherited	PB	13.7	±1.50	0.105	±0.03	2.01	±0.54	3.5	±0.7	0.70	±0.15
353388	7	RIM	Discordant	PB	10.5	±0.29	0.018	±0.01	0.58	±0.11	1.2	±0.2	0.33	±0.04
353388	8	RIM	Main Population	PB	12.7	±0.38	0.046	±0.02	0.87	±0.20	1.7	±0.3	0.39	±0.06
353388	9	RIM	Discordant	PB	10.8	±0.28	0.021	±0.01	0.45	±0.10	1.3	±0.2	0.32	±0.05
353388	10	RIM	Discordant	PB	8.8	±0.61	0.030	±0.02	0.54	±0.19	2.1	±0.5	0.46	±0.10
353388	11	RIM	Main Population	PB	11.3	±0.55	0.141	±0.03	2.33	±0.40	4.6	±0.5	1.10	±0.13
353388	12	RIM	Main Population	PB	13.7	±1.40	0.293	±0.07	3.46	±0.57	5.1	±0.5	1.12	±0.16
353388	13	RIM	Discordant	PB	8.1	±0.41	0.099	±0.02	2.04	±0.25	4.0	±0.4	1.10	±0.11
353388	14	RIM	Main Population	PB	8.1	±0.28	0.097	±0.03	1.04	±0.17	1.8	±0.4	0.55	±0.08
353388	15	RIM	Main Population	PB	18.5	±1.40	0.151	±0.04	2.25	±0.45	5.0	±0.7	1.17	±0.18

Table A1. 3 continued: Zircon geochemistry for Ce, Pr, Nd, Sm and Eu. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	140 Ce		141 Pr		146 Nd		147 Sm		153 Eu	
353388	16	RIM	Main Population	PB	15.9	±1.30	0.350	±0.12	3.26	±0.52	5.7	±1.1	1.27	±0.24
353388	17	RIM	Inherited	PB	10.1	±0.41	0.161	±0.03	3.54	±0.32	7.7	±0.6	1.01	±0.12
353388	19	RIM	Main Population	PB	8.6	±0.42	0.050	±0.01	1.06	±0.16	2.5	±0.3	0.70	±0.08
353388	20	RIM	Main Population	PB	8.2	±0.23	0.025	±0.01	0.55	±0.11	1.4	±0.2	0.37	±0.05
353388	21	RIM	Main Population	PB	11.3	±0.37	0.153	±0.02	3.45	±0.37	6.6	±0.4	1.62	±0.14
353388	22	RIM	Main Population	PB	9.6	±0.57	0.071	±0.02	0.99	±0.17	2.2	±0.3	0.62	±0.08
353388	23	RIM	Main Population	PB	12.1	±0.40	0.257	±0.03	4.34	±0.33	6.8	±0.5	1.61	±0.11
353388	24	RIM	Main Population	PB	12.3	±0.44	0.259	±0.04	3.73	±0.35	6.4	±0.5	1.44	±0.12
353388	25	RIM	Main Population	PB	8.9	±0.34	0.043	±0.02	0.51	±0.14	1.5	±0.3	0.35	±0.05
353388	26	RIM	Discordant	PB	11.0	±0.50	0.162	±0.03	2.71	±0.31	4.6	±0.4	1.12	±0.10
353388	27	RIM	Main Population	PB	10.4	±0.50	0.032	±0.02	0.65	±0.18	1.8	±0.3	0.47	±0.08
353388	28	RIM	Discordant	PB	14.0	±0.45	0.204	±0.03	3.34	±0.30	6.5	±0.4	1.50	±0.13
353388	29	RIM	Lead Loss	PB	27.3	±1.70	0.269	±0.06	2.33	±0.32	2.7	±0.3	0.37	±0.07
353388	30	RIM	Discordant	PB	15.0	±1.10	0.131	±0.05	2.17	±0.42	3.9	±0.7	1.10	±0.20
353388	31	RIM	Main Population	PB	9.9	±0.52	0.090	±0.02	1.62	±0.30	3.5	±0.5	0.72	±0.12
353388	32	RIM	Discordant	PB	6.6	±2.40	0.080	±0.03	1.56	±0.58	3.0	±1.3	0.67	±0.28
353388	33	RIM	Main Population	PB	14.6	±0.39	0.026	±0.01	0.37	±0.10	1.3	±0.2	0.26	±0.05
353388	34	RIM	Main Population	PB	18.4	±0.83	0.386	±0.05	4.94	±0.46	9.2	±0.9	2.06	±0.21
353388	35	RIM	Main Population	PB	10.5	±0.36	0.091	±0.02	1.42	±0.28	3.2	±0.5	0.73	±0.10
353388	36	RIM	Main Population	PB	15.0	±0.96	0.086	±0.03	1.17	±0.27	2.4	±0.4	0.51	±0.07
353388	37	RIM	Lead Loss	PB	17.8	±1.60	0.400	±0.17	4.13	±0.98	3.7	±1.4	0.60	±0.28
353388	38	RIM	Main Population	PB	10.2	±0.31	0.014	±0.01	0.33	±0.07	1.1	±0.2	0.32	±0.05
353388	39	RIM	Main Population	PB	8.4	±0.26	0.058	±0.02	1.19	±0.17	2.1	±0.3	0.54	±0.07
353388	40	RIM	Main Population	PB	16.4	±0.49	0.050	±0.03	0.88	±0.26	1.5	±0.3	0.25	±0.06
353388	41	RIM	Titanite/Apatite Inclusions	PB	89.7	±9.30	10.100	±1.30	46.60	±6.00	13.0	±1.5	1.58	±0.16
353388	42	RIM	Rejected	PB	21.5	±3.60	0.590	±0.18	4.50	±1.10	4.7	±0.9	1.05	±0.24
353388	43	RIM	Main Population	PB	10.8	±0.29	0.029	±0.01	0.45	±0.11	1.5	±0.2	0.38	±0.06
353388	44	RIM	Lead Loss	PB	10.4	±0.53	0.034	±0.01	0.45	±0.10	1.4	±0.2	0.28	±0.04
353388	45	RIM	Main Population	PB	14.6	±0.63	0.036	±0.02	0.63	±0.18	1.8	±0.4	0.35	±0.09
353388	46	RIM	Main Population	PB	12.2	±0.43	0.027	±0.01	0.38	±0.10	1.3	±0.2	0.31	±0.05
353388	47	RIM	Titanite/Apatite Inclusions	PB	72.0	±16.00	3.510	±0.88	20.20	±5.00	14.3	±3.1	2.16	±0.39

Table A1. 3 continued: Zircon geochemistry for Ce, Pr, Nd, Sm and Eu. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	140 Ce		141 Pr		146 Nd		147 Sm		153 Eu	
353388	48	RIM	Main Population	PB	9.8	±0.38	0.035	±0.02	0.64	±0.16	1.1	±0.2	0.30	±0.06
353388	49	RIM	Main Population	PB	12.0	±0.32	0.105	±0.02	2.19	±0.24	4.8	±0.3	1.19	±0.11
353388	50	RIM	Inherited	PB	11.1	±0.53	0.174	±0.05	2.72	±0.46	4.0	±0.6	0.95	±0.16
353390	1	RIM	Titanite/Apatite Inclusions	PB	33.9	±8.10	3.300	±1.20	13.10	±4.70	3.6	±0.9	0.50	±0.09
353390	2	CORE	Inherited	PB	8.8	±0.30	0.082	±0.02	1.84	±0.18	3.7	±0.3	0.93	±0.10
353390	2	RIM	Inherited	PB	9.4	±0.27	b.l.d.		0.14	±0.08	0.5	±0.1	0.15	±0.04
353390	3	RIM	Discordant	PB	31.3	±5.00	0.110	±0.04	1.90	±0.36	3.9	±0.7	1.07	±0.14
353390	4	RIM	Main Population	PB	33.4	±1.90	0.122	±0.08	1.33	±0.50	3.3	±1.1	0.77	±0.21
353390	5	RIM	Main Population	PB	14.7	±0.46	0.112	±0.02	1.74	±0.24	4.7	±0.4	1.27	±0.11
353390	6	RIM	Lead Loss	PB	19.6	±5.60	0.045	±0.02	0.77	±0.28	1.4	±0.4	0.49	±0.14
353390	7	RIM	Lead Loss	PB	16.9	±0.97	0.046	±0.01	0.91	±0.16	2.2	±0.3	0.66	±0.08
353390	8	RIM	Main Population	PB	37.3	±1.50	0.113	±0.03	1.34	±0.22	3.2	±0.4	0.87	±0.13
353390	9	RIM	Titanite/Apatite Inclusions	PB	37.0	±1.90	1.260	±0.22	5.21	±0.85	2.6	±0.3	0.59	±0.07
353390	10	RIM	Main Population	PB	6.4	±0.30	0.015	±0.01	0.41	±0.09	1.0	±0.2	0.27	±0.05
353390	11	RIM	Discordant	PB	11.9	±0.51	0.049	±0.01	1.12	±0.17	2.9	±0.3	0.67	±0.08
353390	12	RIM	Main Population	PB	9.5	±0.28	0.023	±0.01	0.54	±0.12	1.3	±0.2	0.51	±0.07
353390	13	CORE	Discordant	PB	11.0	±0.41	0.062	±0.02	1.31	±0.23	2.7	±0.4	0.61	±0.08
353390	13	RIM	Main Population	PB	31.3	±0.48	0.053	±0.02	0.72	±0.12	2.0	±0.2	0.60	±0.06
353390	14	RIM	Lead Loss	PB	10.1	±1.00	0.067	±0.02	1.04	±0.18	2.3	±0.3	0.60	±0.08
353390	15	RIM	Main Population	PB	10.3	±0.30	b.l.d.		0.25	±0.08	1.0	±0.2	0.21	±0.04
353390	16	RIM	Main Population	PB	9.8	±0.28	0.029	±0.01	0.56	±0.11	1.5	±0.2	0.26	±0.05
353390	17	RIM	Discordant	PB	36.2	±3.70	0.061	±0.05	0.59	±0.28	1.9	±0.6	0.72	±0.22
353390	18	RIM	Lead Loss	PB	42.6	±2.50	0.064	±0.02	1.13	±0.21	2.4	±0.4	0.87	±0.11
353390	19	RIM	Main Population	PB	9.2	±0.29	0.019	±0.01	0.31	±0.08	1.0	±0.2	0.28	±0.05
353390	20	RIM	Main Population	PB	28.2	±1.50	0.107	±0.04	1.04	±0.25	2.0	±0.3	0.58	±0.08
353390	21	RIM	Main Population	PB	9.1	±0.28	0.025	±0.01	0.67	±0.10	1.5	±0.2	0.43	±0.05
353390	22	RIM	Main Population	PB	10.1	±0.28	b.l.d.		0.40	±0.10	1.1	±0.2	0.32	±0.05
353390	23	RIM	Main Population	PB	25.6	±1.10	0.074	±0.03	1.25	±0.37	2.1	±0.4	0.66	±0.17
353390	24	RIM	Lead Loss	PB	9.9	±1.40	0.342	±0.06	2.80	±0.44	3.5	±0.6	1.05	±0.16
353390	25	RIM	Main Population	PB	13.2	±0.46	0.071	±0.02	1.17	±0.26	2.1	±0.4	0.61	±0.11
353390	26	RIM	Inherited	PB	9.6	±0.47	0.027	±0.01	0.69	±0.13	1.4	±0.2	0.35	±0.05

Table A1. 3 continued: Zircon geochemistry for Ce, Pr, Nd, Sm and Eu. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	140 Ce		141 Pr		146 Nd		147 Sm		153 Eu	
353390	27	RIM	Lead Loss	PB	11.2	±0.50	0.034	±0.02	0.68	±0.17	1.3	±0.2	0.40	±0.08
353390	28	RIM	Main Population	PB	23.3	±4.20	0.039	±0.01	0.85	±0.23	2.1	±0.5	0.63	±0.13
353390	29	RIM	Discordant	PB	19.7	±1.10	0.025	±0.01	0.41	±0.12	1.2	±0.2	0.34	±0.07
353390	30	RIM	Main Population	PB	20.4	±0.39	0.016	±0.01	0.46	±0.10	1.3	±0.2	0.34	±0.05
353390	31	RIM	Main Population	PB	12.2	±0.64	0.108	±0.02	1.88	±0.29	3.8	±0.5	1.01	±0.13
353390	32	RIM	Main Population	PB	19.0	±0.48	0.027	±0.02	0.52	±0.19	1.4	±0.3	0.30	±0.06
353390	33	CORE	Main Population	PB	14.2	±1.50	0.133	±0.03	2.32	±0.30	4.9	±0.5	1.19	±0.11
353390	33	MID	Main Population	PB	12.1	±1.10	0.102	±0.02	1.48	±0.25	3.4	±0.4	0.92	±0.11
353390	33	RIM	Main Population	PB	44.0	±0.97	0.094	±0.03	1.58	±0.24	3.4	±0.4	0.94	±0.11
353390	34	RIM	Main Population	PB	22.7	±1.80	0.059	±0.02	1.62	±0.19	4.3	±0.4	0.99	±0.10
353390	35	RIM	Main Population	PB	19.0	±1.40	0.044	±0.02	0.76	±0.15	1.5	±0.2	0.44	±0.06
353390	36	RIM	Discordant	PB	25.4	±0.56	0.015	±0.01	0.45	±0.13	1.4	±0.2	0.42	±0.07
353390	37	RIM	Main Population	PB	40.4	±3.80	0.066	±0.05	1.24	±0.47	3.3	±1.0	0.56	±0.13
353390	38	RIM	Lead Loss	PB	21.1	±1.90	0.087	±0.02	1.71	±0.23	3.9	±0.4	1.00	±0.11
353390	39	RIM	Main Population	PB	14.0	±2.60	0.064	±0.03	1.19	±0.37	2.6	±0.6	0.72	±0.21
353390	40	CORE	Inherited	PB	10.0	±0.41	0.099	±0.02	1.78	±0.23	3.6	±0.3	1.05	±0.10
353390	40	RIM	Main Population	PB	11.6	±0.40	0.015	±0.01	0.44	±0.10	1.2	±0.2	0.31	±0.05
353390	41	RIM	Lead Loss	PB	3.6	±0.94	0.010	±0.01	0.20	±0.09	0.5	±0.2	0.14	±0.05
353390	42	RIM	Discordant	PB	20.8	±1.00	0.146	±0.04	2.46	±0.64	5.8	±1.4	2.11	±0.49
353390	43	RIM	Main Population	PB	16.5	±1.10	0.079	±0.02	1.49	±0.29	3.4	±0.5	0.87	±0.15
353390	44	RIM	Inherited	PB	10.5	±0.57	0.014	±0.01	0.26	±0.07	0.8	±0.2	0.25	±0.04
353390	44	CORE	Inherited	PB	14.8	±0.41	0.075	±0.02	1.41	±0.19	2.9	±0.3	0.95	±0.09
353390	45	RIM	Inherited	PB	22.8	±2.10	0.051	±0.02	1.07	±0.20	3.0	±0.5	0.83	±0.11
353390	46	RIM	Main Population	PB	27.3	±0.77	0.028	±0.02	0.42	±0.18	1.5	±0.3	0.45	±0.08
353390	47	RIM	Main Population	PB	8.7	±0.43	0.012	±0.01	0.16	±0.06	0.5	±0.1	0.16	±0.03
353390	48	RIM	Discordant	PB	13.3	±0.34	0.041	±0.01	0.77	±0.13	1.7	±0.2	0.59	±0.07
353390	48	CORE	Main Population	PB	9.4	±0.27	0.019	±0.01	0.33	±0.09	0.8	±0.2	0.24	±0.04
353393	1	RIM	Main Population	TYC	41.4	±1.10	0.121	±0.04	1.30	±0.26	3.4	±0.4	1.43	±0.15
353393	2	RIM	Main Population	TYC	17.4	±1.00	0.077	±0.04	0.62	±0.29	1.7	±0.5	0.65	±0.14
353393	3	RIM	Discordant	TYC	14.1	±0.62	0.070	±0.04	0.68	±0.26	1.0	±0.3	0.51	±0.11
353393	4	RIM	Discordant	TYC	31.5	±2.30	0.036	±0.01	0.88	±0.17	2.1	±0.3	1.07	±0.13

Table A1. 3 continued: Zircon geochemistry for Ce, Pr, Nd, Sm and Eu. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	140 Ce		141 Pr		146 Nd		147 Sm		153 Eu	
353393	5	RIM	Main Population	TYC	27.0	±0.52	0.043	±0.01	0.64	±0.12	1.5	±0.2	0.71	±0.08
353393	6	CORE	Inherited	TYC	17.6	±1.40	0.055	±0.01	0.56	±0.12	1.6	±0.2	0.78	±0.10
353393	6	RIM	Main Population	TYC	19.1	±0.36	0.012	±0.01	0.46	±0.10	1.1	±0.2	0.48	±0.06
353393	7	RIM	Discordant	TYC	20.3	±1.00	0.066	±0.02	0.88	±0.15	1.9	±0.3	0.87	±0.10
353393	8	CORE	Main Population	TYC	18.2	±0.54	0.061	±0.02	0.98	±0.16	2.1	±0.3	1.07	±0.11
353393	8	RIM	Discordant	TYC	17.2	±2.90	0.046	±0.02	0.62	±0.23	1.0	±0.3	0.65	±0.14
353393	9	RIM	Lead Loss	TYC	22.8	±0.97	0.059	±0.03	0.43	±0.15	1.3	±0.4	0.54	±0.11
353393	10	RIM	Main Population	TYC	13.5	±3.20	0.017	±0.01	0.66	±0.19	1.5	±0.4	0.69	±0.17
353393	11	RIM	Inherited	TYC	5.8	±0.29	b.l.d.		0.21	±0.10	0.8	±0.3	0.14	±0.05
353393	12	RIM	Discordant	TYC	35.8	±0.69	0.087	±0.03	1.12	±0.26	2.8	±0.4	1.40	±0.15
353393	13	RIM	Main Population	TYC	23.7	±1.70	0.034	±0.01	0.91	±0.22	2.5	±0.3	1.09	±0.14
353393	14	RIM	Main Population	TYC	23.6	±0.62	0.127	±0.04	0.65	±0.21	1.2	±0.4	0.85	±0.14
353393	15	RIM	Inherited	TYC	18.7	±1.90	0.038	±0.02	0.80	±0.22	2.0	±0.4	0.96	±0.16
353393	16	RIM	Main Population	TYC	23.0	±2.00	0.042	±0.02	0.54	±0.13	1.3	±0.3	0.68	±0.10
353393	17	RIM	Lead Loss	TYC	6.9	±0.23	0.049	±0.01	1.01	±0.15	2.2	±0.2	1.32	±0.10
353393	17	CORE	Lead Loss	TYC	11.6	±0.46	0.168	±0.03	3.10	±0.23	5.8	±0.4	3.30	±0.18
353393	18	RIM	Inherited	TYC	17.5	±1.50	0.046	±0.06	0.27	±0.25	0.9	±0.5	0.49	±0.29
353393	19	RIM	Main Population	TYC	13.2	±1.90	0.019	±0.02	0.30	±0.17	0.5	±0.3	0.39	±0.12
353393	20	RIM	Main Population	TYC	11.5	±0.39	0.026	±0.01	0.43	±0.10	1.0	±0.2	0.50	±0.07
353393	21	RIM	Main Population	TYC	21.6	±0.60	0.025	±0.01	0.73	±0.13	2.2	±0.2	1.14	±0.10
353393	22	RIM	Discordant	TYC	21.9	±1.40	0.067	±0.02	1.23	±0.33	2.8	±0.5	1.27	±0.19
353393	23	RIM	Main Population	TYC	33.9	±3.70	0.029	±0.01	0.73	±0.21	2.6	±0.5	1.31	±0.20
353393	24	RIM	Main Population	TYC	25.2	±0.72	0.019	±0.01	0.33	±0.09	1.2	±0.2	0.69	±0.07
353393	25	RIM	Inherited	TYC	14.8	±1.60	0.172	±0.09	0.95	±0.56	1.3	±0.8	0.80	±0.34
353393	26	RIM	Main Population	TYC	13.1	±0.43	0.055	±0.02	0.68	±0.17	1.6	±0.2	0.88	±0.09
353393	27	RIM	Main Population	TYC	13.8	±0.57	0.067	±0.02	1.17	±0.18	2.3	±0.3	1.17	±0.14
353393	28	RIM	Main Population	TYC	41.9	±6.30	0.076	±0.04	2.06	±0.88	3.8	±0.9	2.29	±0.70
353393	29	RIM	Main Population	TYC	17.0	±1.40	0.088	±0.04	0.83	±0.38	2.0	±0.9	0.96	±0.19
353393	30	RIM	Inherited	TYC	6.2	±0.30	0.012	±0.01	0.53	±0.14	1.4	±0.3	0.46	±0.09
353393	31	RIM	Main Population	TYC	16.2	±0.47	0.026	±0.01	0.24	±0.08	0.6	±0.1	0.38	±0.06
353393	31	CORE	Discordant	TYC	18.9	±0.63	0.032	±0.01	0.88	±0.15	1.8	±0.2	0.76	±0.09

Table A1. 3 continued: Zircon geochemistry for Ce, Pr, Nd, Sm and Eu. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	140 Ce		141 Pr		146 Nd		147 Sm		153 Eu	
353393	32	RIM	Inherited	TYC	19.3	±0.88	0.124	±0.03	2.49	±0.35	5.4	±0.6	3.00	±0.31
353393	33	CORE	Main Population	TYC	10.2	±0.61	0.015	±0.01	0.19	±0.09	0.6	±0.2	0.30	±0.06
353393	33	RIM	Main Population	TYC	18.2	±0.75	0.030	±0.02	0.47	±0.14	0.8	±0.2	0.44	±0.08
353393	34	RIM	Discordant	TYC	30.8	±1.80	0.074	±0.04	0.66	±0.24	1.4	±0.4	0.81	±0.14
353393	35	RIM	Inherited	TYC	18.2	±2.10	0.021	±0.02	0.37	±0.19	1.8	±0.5	0.72	±0.17
353393	36	RIM	Main Population	TYC	15.4	±0.60	0.031	±0.01	0.61	±0.12	1.3	±0.2	0.71	±0.08
353393	37	RIM	Main Population	TYC	30.6	±1.30	0.050	±0.03	0.81	±0.25	2.5	±0.5	1.12	±0.18
353393	38	RIM	Inherited	TYC	17.2	±0.99	0.033	±0.02	0.50	±0.22	1.2	±0.4	0.65	±0.14
353393	39	RIM	Main Population	TYC	22.6	±2.40	0.040	±0.02	0.34	±0.14	1.2	±0.3	0.77	±0.15
353393	40	RIM	Main Population	TYC	20.6	±0.62	0.015	±0.01	0.43	±0.11	1.3	±0.2	0.60	±0.08
353393	41	CORE	Main Population	TYC	17.6	±1.50	0.036	±0.01	0.84	±0.18	1.8	±0.3	0.95	±0.14
353393	41	RIM	Main Population	TYC	25.0	±1.70	0.026	±0.02	0.79	±0.22	2.0	±0.3	0.84	±0.12
353393	42	RIM	Main Population	TYC	12.6	±0.40	b.l.d.		0.20	±0.07	0.5	±0.1	0.37	±0.04
353393	42	CORE	Inherited	TYC	14.3	±0.74	b.l.d.		b.l.d.		0.5	±0.2	0.33	±0.11
353393	43	RIM	Inherited	TYC	15.2	±2.30	0.027	±0.02	0.88	±0.30	1.6	±0.4	0.78	±0.20
353393	44	RIM	Inherited	TYC	30.6	±2.20	0.038	±0.01	0.98	±0.22	2.9	±0.4	1.20	±0.16
353393	45	RIM	Main Population	TYC	29.4	±1.30	0.050	±0.02	0.73	±0.26	1.7	±0.4	0.74	±0.13
353393	46	RIM	Inherited	TYC	32.1	±1.10	0.055	±0.02	0.92	±0.23	2.3	±0.3	0.84	±0.10
353393	46	CORE	Inherited	TYC	37.9	±2.20	0.069	±0.02	1.45	±0.25	3.6	±0.5	1.64	±0.18
353393	47	RIM	Inherited	TYC	12.2	±0.54	0.016	±0.01	0.17	±0.07	0.7	±0.2	0.37	±0.05
353393	47	CORE	Lead Loss	TYC	63.0	±1.50	0.233	±0.06	3.44	±0.61	6.3	±0.9	2.84	±0.32
353393	48	CORE	Inherited	TYC	10.1	±0.52	0.034	±0.01	0.38	±0.10	1.0	±0.2	0.54	±0.06
353393	48	RIM	Main Population	TYC	19.9	±0.93	0.016	±0.01	0.36	±0.09	1.1	±0.2	0.55	±0.07
353393	48	CORE	Main Population	TYC	15.9	±1.70	0.014	±0.01	0.37	±0.14	1.1	±0.2	0.69	±0.11
353393	49	RIM	Discordant	TYC	12.0	±0.87	0.018	±0.02	0.23	±0.17	0.2	±0.1	0.28	±0.09
353393	49	CORE	Discordant	TYC	82.1	±2.80	0.338	±0.05	7.09	±0.50	16.5	±1.1	8.81	±0.53
353393	50	RIM	Lead Loss	TYC	34.1	±2.50	0.020	±0.02	1.37	±0.41	4.1	±0.9	1.59	±0.32
353393	50	CORE	Lead Loss	TYC	48.2	±3.00	0.970	±0.24	4.70	±1.30	3.3	±0.9	1.91	±0.42
353393	51	RIM	Inherited	TYC	22.3	±1.20	b.l.d.		0.40	±0.13	1.3	±0.3	0.75	±0.14
353393	51	CORE	Main Population	TYC	25.4	±0.84	0.101	±0.02	1.72	±0.29	3.5	±0.4	1.46	±0.16
353393	51	MID	Inherited	TYC	41.0	±2.10	0.063	±0.02	1.03	±0.16	3.4	±0.4	1.30	±0.11

Table A1. 3 continued: Zircon geochemistry for Ce, Pr, Nd, Sm and Eu. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	140 Ce		141 Pr		146 Nd		147 Sm		153 Eu	
353393	52	MID	Main Population	TYC	15.3	±0.56	b.l.d.		0.26	±0.09	0.9	±0.2	0.50	±0.07
353393	52	CORE	Inherited	TYC	14.9	±0.80	0.066	±0.02	1.10	±0.17	2.2	±0.2	0.98	±0.11
353393	52	RIM	Discordant	TYC	18.3	±0.60	0.018	±0.01	0.45	±0.11	1.0	±0.2	0.43	±0.05
353393	53	RIM	Inherited	TYC	13.3	±0.38	0.134	±0.03	2.46	±0.29	4.3	±0.4	1.59	±0.14
353393	54	RIM	Discordant	TYC	22.4	±2.00	0.084	±0.04	1.27	±0.30	2.2	±0.5	1.04	±0.20

Table A1. 4: Zircon geochemistry for Gd, Dy, Yb, Lu, Hf. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	157 Gd		163 Dy		172 Yb		175 Lu		177 Hf	
353353	1	RIM	Lead Loss	PB	5.3	±0.4	23	±0.8	94	±3	21.0	±0.6	9150	±300
353353	2	RIM	Lead Loss	PB	20.6	±0.8	75	±1.5	219	±5	45.1	±1.2	9030	±280
353353	3	RIM	Lead Loss	PB	7.8	±2.1	32	±8.2	122	±30	26.6	±6.5	5000	±1200
353353	4	RIM	Lead Loss	PB	5.0	±0.7	26	±2.8	124	±8	28.6	±1.9	10560	±170
353353	5	RIM	Lead Loss	PB	20.6	±1.1	77	±2.6	270	±3	59.0	±0.7	10470	±300
353353	6	RIM	Main Population	PB	8.0	±0.5	36	±1.3	132	±5	28.2	±1.1	9280	±290
353353	7	RIM	Main Population	PB	8.2	±0.9	37	±2.2	193	±9	44.6	±1.8	11130	±420
353353	8	RIM	Main Population	PB	28.9	±1.1	109	±3.5	355	±11	74.1	±2.4	7730	±140
353353	9	RIM	Main Population	PB	15.0	±1.4	62	±3.6	243	±8	52.4	±1.3	12360	±210
353353	10	RIM	Discordant	PB	17.1	±1.5	86	±2.8	420	±12	92.8	±2.3	11370	±330
353353	11	RIM	Main Population	PB	11.3	±0.7	43	±1.6	145	±4	31.4	±1.0	9160	±320
353353	12	RIM	Main Population	PB	8.5	±0.6	35	±1.4	132	±5	28.3	±1.3	9320	±350
353353	13	RIM	Main Population	PB	24.1	±1.1	87	±2.4	255	±7	53.7	±1.4	8940	±230
353353	14	RIM	Main Population	PB	19.5	±1.1	68	±2.1	204	±3	42.1	±0.6	8770	±300
353353	15	RIM	Lead Loss	PB	30.1	±8.9	74	±16.0	178	±9	37.1	±1.8	9445	±76
353353	16	RIM	Main Population	PB	8.1	±0.6	38	±1.1	166	±4	36.8	±0.8	10840	±350
353353	17	RIM	Lead Loss	PB	9.4	±2.0	44	±2.8	175	±6	38.1	±1.2	11590	±370
353353	18	RIM	Main Population	PB	27.3	±2.5	89	±5.9	264	±16	53.9	±2.9	9460	±260
353353	19	RIM	Discordant	PB	14.5	±1.6	57	±2.4	270	±7	60.9	±1.5	13110	±300
353353	20	RIM	Main Population	PB	20.5	±1.6	85	±3.7	272	±7	56.8	±1.5	11140	±410
353353	21	RIM	Main Population	PB	14.9	±2.6	53	±8.3	171	±22	35.4	±4.4	9660	±230
353353	22	RIM	Main Population	PB	20.8	±1.6	69	±4.8	198	±11	40.8	±2.2	8800	±260
353353	23	RIM	Lead Loss	PB	7.9	±0.5	33	±1.1	120	±4	25.6	±0.8	9220	±330
353353	24	RIM	Main Population	PB	7.4	±0.5	33	±1.2	126	±4	27.5	±0.8	9400	±300
353353	25	RIM	Main Population	PB	26.4	±1.4	96	±2.9	277	±8	56.6	±1.8	10250	±330
353353	26	RIM	Lead Loss	PB	18.6	±1.5	76	±4.3	312	±13	68.2	±2.6	12080	±250
353353	27	RIM	Main Population	PB	13.6	±1.2	58	±3.1	239	±9	51.6	±1.8	9540	±250
353353	28	RIM	Lead Loss	PB	7.8	±2.4	29	±9.0	114	±37	25.1	±8.1	5400	±1800
353353	29	RIM	Discordant	PB	9.1	±0.5	39	±1.2	143	±4	30.4	±0.8	8790	±280
353353	30	RIM	Lead Loss	PB	5.7	±0.5	29	±0.9	174	±8	42.6	±2.9	12080	±180
353353	31	RIM	Main Population	PB	10.2	±0.7	42	±1.8	151	±6	32.5	±1.4	8720	±230

Table A1. 4 continued: Zircon geochemistry for Gd, Dy, Yb, Lu, Hf. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	157 Gd		163 Dy		172 Yb		175 Lu		177 Hf	
353353	32	RIM	Lead Loss	PB	6.5	±0.5	33	±1.6	162	±7	37.0	±1.8	10050	±160
353353	33	RIM	Main Population	PB	24.4	±4.6	78	±8.9	213	±15	43.7	±2.9	8920	±320
353353	34	RIM	Main Population	PB	10.8	±0.7	43	±1.6	164	±4	35.2	±0.9	9750	±290
353353	35	RIM	Discordant	PB	21.2	±1.3	69	±2.6	199	±4	41.5	±0.9	8690	±240
353353	36	RIM	Lead Loss	PB	31.2	±2.9	92	±5.6	247	±7	51.4	±1.6	10460	±280
353353	37	RIM	Inherited	PB	9.1	±0.6	41	±1.6	207	±9	47.9	±2.3	10400	±260
353353	38	RIM	Lead Loss	PB	12.0	±1.0	63	±3.0	298	±12	66.4	±2.7	12070	±310
353353	39	RIM	Main Population	PB	10.7	±0.9	47	±2.9	192	±9	42.3	±1.9	9690	±270
353353	40	RIM	Lead Loss	PB	19.7	±0.8	80	±2.3	244	±7	49.5	±1.5	9700	±280
353353	41	RIM	Discordant	PB	9.0	±0.7	43	±1.6	194	±5	42.4	±0.9	10890	±250
353353	42	RIM	Main Population	PB	19.2	±1.0	77	±2.0	280	±6	59.4	±1.5	10340	±220
353353	43	RIM	Main Population	PB	8.7	±0.7	41	±1.5	195	±5	44.5	±1.2	11400	±240
353353	44	RIM	Titanite/Apatite Inclusions	PB	15.3	±1.8	58	±6.6	262	±27	57.8	±4.3	8630	±730
353353	45	RIM	Discordant	PB	4.5	±1.3	23	±6.8	106	±30	23.7	±6.8	5200	±1600
353353	46	RIM	Discordant	PB	8.5	±0.6	35	±1.4	123	±4	25.8	±0.9	8990	±290
353353	47	RIM	Main Population	PB	9.5	±1.1	40	±2.0	138	±5	28.7	±1.0	7860	±150
353353	48	RIM	Main Population	PB	6.9	±0.7	32	±1.1	142	±2	30.4	±0.7	9010	±100
353353	49	RIM	Main Population	PB	6.8	±0.5	29	±0.9	117	±4	25.2	±0.8	9700	±310
353355	1	RIM	Main Population	PB	7.4	±0.6	37	±1.4	181	±3	40.6	±0.7	11820	±180
353355	2	RIM	Main Population	PB	8.8	±0.5	39	±1.5	144	±6	31.0	±1.5	9390	±220
353355	3	RIM	Main Population	PB	23.9	±2.5	84	±8.3	277	±27	58.4	±5.7	7410	±770
353355	4	RIM	Lead Loss	PB	8.5	±0.6	38	±1.6	142	±5	30.0	±1.0	9850	±250
353355	5	RIM	Discordant	PB	10.9	±0.5	47	±1.3	168	±3	36.3	±0.8	8700	±190
353355	6	RIM	Discordant	PB	23.0	±1.4	86	±3.4	257	±9	53.4	±1.9	9070	±160
353355	7	RIM	Main Population	PB	8.0	±0.5	38	±1.4	156	±5	33.7	±1.2	9760	±290
353355	8	RIM	Main Population	PB	6.8	±2.1	27	±8.2	90	±26	19.1	±5.6	5500	±1600
353355	9	RIM	Inherited	PB	21.9	±0.9	82	±2.9	233	±7	47.9	±1.4	9080	±250
353355	10	RIM	Main Population	PB	20.8	±1.5	79	±4.9	252	±14	52.8	±2.9	10020	±220
353355	10	CORE	Main Population	PB	5.1	±1.9	29	±8.6	187	±27	45.3	±5.2	14420	±490
353355	11	RIM	Main Population	PB	17.9	±1.1	69	±2.4	223	±5	46.2	±1.2	9430	±190
353355	12	RIM	Main Population	PB	27.9	±1.5	105	±4.2	332	±11	68.9	±2.3	8880	±290

Table A1. 4 continued: Zircon geochemistry for Gd, Dy, Yb, Lu, Hf. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	157 Gd		163 Dy		172 Yb		175 Lu		177 Hf	
353355	13	RIM	Main Population	PB	20.4	±1.9	74	±5.7	228	±11	47.3	±2.2	9450	±230
353355	14	CORE	Main Population	PB	10.5	±0.6	42	±1.4	143	±4	30.8	±0.9	8930	±290
353355	14	MID	Main Population	PB	9.1	±0.4	38	±1.0	133	±3	28.1	±0.6	8740	±210
353355	14	MID	Lead Loss	PB	7.6	±0.5	33	±1.3	115	±4	24.5	±0.8	8800	±180
353355	14	RIM	Discordant	PB	7.5	±0.5	33	±1.6	126	±5	26.7	±1.0	9630	±250
353355	15	RIM	Main Population	PB	24.7	±2.7	93	±7.5	308	±8	66.6	±1.1	11050	±210
353355	16	RIM	Main Population	PB	8.3	±0.5	37	±1.0	146	±3	31.1	±0.7	9610	±270
353355	17	RIM	Main Population	PB	12.4	±0.7	47	±1.9	166	±6	36.4	±1.5	8370	±200
353355	18	RIM	Main Population	PB	5.5	±0.6	24	±1.5	118	±5	28.4	±1.2	10010	±300
353355	19	RIM	Lead Loss	PB	5.5	±0.4	25	±0.8	101	±2	21.9	±0.4	9000	±240
353355	20	RIM	Main Population	PB	14.7	±0.9	59	±2.5	186	±5	38.9	±0.9	8990	±210
353355	21	CORE	Inherited	PB	15.6	±0.9	69	±3.4	287	±13	61.5	±2.6	7070	±190
353355	21	RIM	Inherited	PB	9.1	±0.5	41	±1.1	185	±5	41.5	±1.1	7740	±210
353355	22	RIM	Main Population	PB	19.9	±1.3	71	±2.8	219	±4	45.8	±0.8	8800	±310
353355	23	RIM	Inherited	PB	31.6	±1.8	118	±7.7	345	±23	71.0	±4.8	8870	±230
353355	24	RIM	Main Population	PB	29.6	±1.2	110	±3.8	322	±10	65.5	±2.2	10390	±310
353355	25	RIM	Main Population	PB	17.6	±1.1	72	±3.4	237	±8	49.9	±1.7	10260	±350
353355	26	RIM	Inherited	PB	5.9	±0.5	27	±1.3	138	±6	32.3	±1.5	10540	±110
353355	27	RIM	Main Population	PB	10.6	±0.6	57	±2.5	278	±15	62.2	±3.3	11450	±350
353355	28	RIM	Main Population	PB	12.6	±1.1	51	±2.5	194	±6	42.2	±1.3	9300	±250
353355	29	RIM	Main Population	PB	6.0	±0.5	29	±1.0	139	±3	31.4	±0.6	10290	±290
353355	30	RIM	Main Population	PB	7.7	±0.4	37	±1.0	157	±5	34.6	±1.2	10070	±120
353355	31	RIM	Discordant	PB	9.2	±1.1	45	±1.9	183	±5	39.8	±1.2	10910	±220
353355	32	RIM	Main Population	PB	8.3	±0.7	39	±1.5	166	±6	36.5	±1.0	12830	±320
353355	33	RIM	Inherited	PB	5.2	±0.4	21	±0.9	99	±2	23.3	±0.5	11130	±390
353355	34	RIM	Main Population	PB	17.0	±2.9	77	±12.0	305	±39	65.6	±7.7	11720	±410
353355	35	RIM	Main Population	PB	7.5	±0.5	36	±1.1	141	±3	30.4	±0.8	9480	±260
353355	36	CORE	Main Population	PB	24.0	±1.9	81	±5.2	230	±12	47.0	±2.6	9300	±280
353355	36	RIM	Main Population	PB	6.3	±0.4	34	±1.2	167	±5	36.8	±1.1	11790	±320
353355	37	RIM	Discordant	PB	28.8	±1.5	104	±4.6	311	±13	65.9	±3.5	11310	±300
353355	38	RIM	Main Population	PB	9.3	±0.6	41	±1.3	156	±5	33.2	±1.0	9500	±310

Table A1. 4 continued: Zircon geochemistry for Gd, Dy, Yb, Lu, Hf. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	157 Gd		163 Dy		172 Yb		175 Lu		177 Hf	
353355	39	RIM	Main Population	PB	9.5	±0.5	43	±1.4	166	±6	35.3	±1.2	10130	±320
353355	40	RIM	Main Population	PB	8.2	±0.4	36	±0.9	131	±3	27.9	±0.7	9570	±230
353355	41	RIM	Main Population	PB	18.6	±0.8	70	±2.4	216	±6	44.2	±1.4	9130	±230
353355	42	RIM	Discordant	PB	13.1	±1.9	47	±4.1	154	±10	32.1	±2.0	7887	±79
353355	43	RIM	Discordant	PB	8.9	±0.6	41	±1.7	151	±6	32.3	±1.3	9220	±270
353355	44	CORE	Main Population	PB	19.6	±1.1	69	±2.4	201	±4	41.1	±0.8	8740	±260
353355	44	RIM	Main Population	PB	9.4	±0.6	39	±1.4	134	±4	28.5	±0.8	9140	±240
353355	45	RIM	Main Population	PB	7.3	±0.4	35	±0.8	162	±2	35.6	±0.5	11210	±290
353355	46	RIM	Main Population	PB	10.3	±0.6	42	±1.4	150	±4	32.2	±1.0	9440	±310
353355	47	RIM	Main Population	PB	8.3	±0.8	38	±2.4	154	±7	32.9	±1.5	10450	±330
353355	48	RIM	Main Population	PB	12.6	±1.1	56	±3.8	203	±9	43.7	±1.7	10450	±300
353355	49	RIM	Main Population	PB	10.9	±1.0	46	±2.6	170	±5	37.5	±0.9	10400	±360
353355	50	RIM	Main Population	PB	15.5	±1.6	72	±5.2	363	±15	80.4	±3.0	12920	±490
353358	1	RIM	Main Population	PB	21.4	±2.1	82	±7.2	288	±24	60.0	±5.1	10450	±320
353358	2	RIM	Main Population	PB	32.0	±1.9	117	±6.8	349	±18	72.7	±3.5	8510	±200
353358	3	RIM	Main Population	PB	18.9	±1.3	70	±3.5	241	±5	50.7	±0.9	8949	±77
353358	4	RIM	Inherited	PB	10.7	±1.1	43	±2.0	156	±4	33.9	±1.1	11300	±200
353358	5	RIM	Main Population	PB	5.2	±1.7	27	±8.7	121	±38	27.5	±8.7	3600	±1200
353358	6	RIM	Main Population	PB	8.6	±0.5	40	±0.8	151	±4	32.7	±0.9	9550	±320
353358	7	RIM	Inherited	PB	22.5	±2.1	74	±4.5	222	±10	47.0	±2.0	10280	±240
353358	8	RIM	Main Population	PB	15.1	±0.9	75	±2.0	383	±11	86.9	±2.5	10710	±350
353358	9	RIM	Main Population	PB	22.9	±5.2	87	±19.0	255	±55	52.0	±11.0	6700	±1400
353358	10	RIM	Main Population	PB	13.9	±0.7	63	±2.5	271	±10	58.7	±2.1	10750	±270
353358	11	RIM	Discordant	PB	29.9	±1.8	121	±6.2	401	±20	83.0	±4.2	8930	±190
353358	13	RIM	Main Population	PB	12.4	±0.6	62	±1.9	304	±9	68.6	±2.1	11130	±280
353358	14	RIM	Main Population	PB	8.9	±0.5	36	±1.0	133	±3	28.6	±0.7	8940	±230
353358	15	RIM	Inherited	PB	3.6	±1.0	15	±3.8	56	±14	12.2	±3.1	4400	±1100
353358	16	RIM	Inherited	PB	8.6	±0.5	39	±1.3	150	±5	32.4	±1.1	9530	±280
353358	17	RIM	Main Population	PB	7.9	±0.4	35	±1.0	139	±6	30.1	±1.3	9840	±350
353358	18	RIM	Discordant	PB	8.9	±0.4	41	±1.2	171	±4	36.9	±0.8	10490	±270
353358	19	RIM	Main Population	PB	11.5	±0.5	47	±1.0	169	±2	35.4	±0.4	9710	±240

Table A1. 4 continued: Zircon geochemistry for Gd, Dy, Yb, Lu, Hf. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	157 Gd		163 Dy		172 Yb		175 Lu		177 Hf	
353358	20	RIM	Main Population	PB	20.0	±6.8	76	±25.0	232	±72	48.0	±15.0	5000	±1400
353358	21	RIM	Main Population	PB	24.4	±1.6	98	±5.1	345	±13	72.8	±2.7	9940	±220
353358	22	RIM	Main Population	PB	7.7	±0.5	37	±0.9	169	±3	37.1	±0.7	10990	±310
353358	23	RIM	Main Population	PB	16.4	±1.3	77	±4.2	367	±15	83.0	±3.3	10910	±300
353358	24	RIM	Main Population	PB	16.3	±1.1	66	±3.3	223	±9	46.9	±1.8	9070	±320
353358	25	RIM	Main Population	PB	6.2	±0.4	29	±1.4	116	±5	25.6	±1.1	9680	±280
353358	26	RIM	Main Population	PB	15.1	±0.9	75	±3.5	386	±15	88.7	±3.6	10270	±270
353358	27	RIM	Main Population	PB	5.6	±1.0	25	±4.3	97	±17	21.2	±3.6	6800	±1200
353358	28	RIM	Main Population	PB	8.7	±0.6	38	±1.8	139	±5	30.3	±1.2	9320	±260
353358	29	RIM	Main Population	PB	13.3	±1.1	64	±2.7	342	±8	78.7	±1.5	9430	±300
353358	30	RIM	Discordant	PB	13.7	±1.0	59	±3.1	234	±8	51.6	±1.6	9960	±300
353358	31	RIM	Main Population	PB	17.0	±1.4	75	±5.2	279	±15	59.2	±3.0	12170	±190
353358	32	RIM	Main Population	PB	9.1	±0.6	43	±1.5	167	±6	35.9	±1.2	10660	±330
353358	33	RIM	Main Population	PB	24.3	±1.9	100	±6.5	431	±18	95.4	±3.7	11790	±220
353358	34	RIM	Titanite/Apatite Inclusions	PB	13.0	±0.7	61	±1.7	293	±6	65.7	±1.4	10840	±240
353358	35	RIM	Main Population	PB	15.1	±1.0	74	±4.2	377	±17	86.0	±3.6	10770	±350
353358	36	CORE	Main Population	PB	17.8	±1.8	65	±4.8	197	±10	41.6	±1.9	8610	±240
353358	36	MID	Main Population	PB	10.5	±0.7	43	±2.3	147	±7	30.9	±1.3	9090	±240
353358	36	RIM	Inherited	PB	5.4	±0.4	27	±1.5	131	±8	29.3	±1.9	10320	±330
353358	37	RIM	Main Population	PB	8.9	±0.4	41	±1.0	160	±4	34.5	±0.9	9720	±290
353358	38	RIM	Main Population	PB	7.7	±2.0	36	±9.1	179	±47	40.0	±10.0	6700	±1600
353358	39	RIM	Inherited	PB	8.8	±0.5	40	±1.3	148	±4	31.6	±0.9	9310	±280
353358	40	RIM	Inherited	PB	8.8	±0.5	40	±1.1	158	±4	33.9	±0.9	10150	±280
353358	41	RIM	Main Population	PB	29.2	±1.8	122	±6.5	366	±16	75.3	±3.3	9952	±95
353358	42	RIM	Main Population	PB	7.0	±0.5	35	±1.3	171	±8	39.2	±2.0	11120	±380
353358	43	RIM	Main Population	PB	8.0	±0.8	39	±1.3	198	±4	46.1	±0.8	12930	±340
353358	44	RIM	Main Population	PB	11.1	±1.2	52	±5.0	246	±25	55.4	±5.7	9560	±240
353358	45	CORE	Main Population	PB	14.8	±1.2	58	±3.9	184	±9	39.0	±1.8	9000	±270
353358	45	RIM	Discordant	PB	7.2	±0.5	34	±1.6	140	±8	30.4	±1.8	9520	±280
353358	46	RIM	Lead Loss	PB	17.2	±2.3	85	±4.7	419	±14	95.0	±2.5	8500	±280
353358	47	CORE	Lead Loss	PB	4.0	±0.4	19	±0.8	81	±2	17.9	±0.4	8580	±110

Table A1. 4 continued: Zircon geochemistry for Gd, Dy, Yb, Lu, Hf. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	157 Gd		163 Dy		172 Yb		175 Lu		177 Hf	
353358	47	RIM	Inherited	PB	5.1	±0.4	26	±1.3	108	±4	23.3	±0.9	9870	±280
353358	48	RIM	Main Population	PB	9.0	±0.5	40	±1.6	152	±7	32.6	±1.5	9280	±230
353358	49	RIM	Main Population	PB	21.3	±1.4	91	±2.9	395	±12	86.3	±2.6	13180	±370
353362	1	RIM	Inherited	PS	8.2	±0.6	36	±1.2	171	±6	39.7	±1.4	8990	±230
353362	2	RIM	Main Population	PS	8.6	±2.1	36	±5.3	218	±15	55.8	±4.0	13690	±400
353362	3	RIM	Main Population	PS	8.8	±0.7	42	±2.2	257	±13	63.3	±3.2	9640	±320
353362	4	RIM	Rejected	PS	8.3	±0.7	34	±1.5	167	±5	41.6	±1.1	11480	±230
353362	5	RIM	Main Population	PS	7.9	±0.5	44	±1.6	338	±17	84.9	±4.2	10750	±140
353362	6	RIM	Main Population	PS	7.1	±0.5	33	±1.8	197	±8	47.9	±2.0	9270	±340
353362	6	CORE	Lead Loss	PS	17.4	±1.2	70	±3.0	281	±5	62.6	±1.7	9600	±230
353362	7	RIM	Inherited	PS	9.2	±0.8	40	±2.5	176	±12	39.4	±2.9	9730	±350
353362	8	RIM	Main Population	PS	4.3	±0.8	19	±3.6	116	±15	29.2	±3.6	11200	±300
353362	9	RIM	Main Population	PS	9.4	±0.6	47	±2.2	253	±10	59.1	±2.3	11080	±340
353362	10	RIM	Main Population	PS	14.1	±1.6	58	±3.4	326	±13	77.8	±3.3	11910	±330
353362	11	RIM	Inherited	PS	5.5	±0.5	28	±1.8	165	±8	42.1	±2.1	10090	±290
353362	12	CORE	Inherited	PS	22.1	±4.5	73	±14.0	212	±37	43.3	±7.3	7900	±1500
353362	12	RIM	Inherited	PS	6.5	±0.5	30	±1.7	125	±7	27.8	±1.6	9640	±350
353362	13	RIM	Inherited	PS	22.9	±1.3	84	±3.2	284	±10	60.6	±2.5	9220	±400
353362	14	RIM	Inherited	PS	6.1	±0.5	32	±2.3	212	±14	53.3	±3.4	10010	±240
353362	15	RIM	Main Population	PS	13.8	±1.4	57	±4.2	214	±9	47.0	±1.6	10070	±290
353362	16	RIM	Main Population	PS	5.4	±0.5	26	±1.1	157	±4	39.6	±1.1	10520	±330
353362	17	RIM	Main Population	PS	5.3	±0.9	24	±1.5	160	±6	41.1	±1.8	13420	±310
353362	18	RIM	Main Population	PS	11.8	±1.0	61	±4.0	346	±15	83.7	±3.7	12880	±730
353362	19	RIM	Main Population	PS	9.6	±0.8	45	±1.6	262	±7	65.6	±1.9	10820	±410
353362	20	CORE	Inherited	PS	7.7	±0.4	34	±1.1	173	±5	42.0	±1.2	9330	±170
353362	20	RIM	Main Population	PS	6.2	±0.5	28	±1.6	164	±7	40.9	±1.8	9570	±270
353362	21	RIM	Main Population	PS	8.2	±1.2	39	±3.3	260	±23	65.8	±5.7	12070	±220
353362	22	CORE	Main Population	PS	7.0	±0.8	33	±1.4	192	±5	47.8	±1.0	11290	±250
353362	22	RIM	Lead Loss	PS	4.3	±0.7	23	±2.3	187	±11	48.4	±2.8	13880	±320
353362	23	CORE	Main Population	PS	8.8	±1.2	42	±4.3	240	±20	58.2	±4.5	10900	±310
353362	23	RIM	Main Population	PS	5.2	±0.5	27	±2.0	198	±20	48.7	±4.8	10470	±200

Table A1. 4 continued: Zircon geochemistry for Gd, Dy, Yb, Lu, Hf. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	157 Gd		163 Dy		172 Yb		175 Lu		177 Hf	
353362	24	RIM	Main Population	PS	30.2	±1.8	119	±4.7	655	±29	156.4	±6.8	14400	±420
353362	25	RIM	Main Population	PS	5.0	±0.6	28	±1.8	186	±15	47.5	±3.8	12470	±290
353362	26	RIM	Main Population	PS	13.0	±1.1	52	±2.8	286	±10	68.9	±2.1	11890	±240
353362	27	RIM	Main Population	PS	6.7	±0.5	32	±1.6	179	±5	43.2	±1.1	10500	±280
353362	28	RIM	Main Population	PS	13.5	±2.4	65	±6.0	350	±33	80.8	±8.3	11440	±970
353362	29	RIM	Lead Loss	PS	19.3	±3.5	87	±12.0	493	±48	119.0	±11.0	13260	±400
353362	30	RIM	Inherited	PS	6.8	±1.0	31	±3.2	192	±14	46.6	±2.6	12470	±520
353362	31	RIM	Lead Loss	PS	19.9	±3.3	76	±8.9	386	±45	87.1	±9.8	10660	±470
353362	32	RIM	Discordant	PS	10.6	±0.6	41	±1.1	149	±3	32.9	±0.5	8300	±270
353362	33	RIM	Lead Loss	PS	11.6	±1.1	47	±3.7	195	±10	44.0	±2.0	10740	±160
353362	34	RIM	Inherited	PS	4.5	±0.5	21	±1.7	123	±7	30.6	±1.7	10110	±310
353362	34	CORE	Inherited	PS	24.1	±6.3	94	±24.0	360	±82	77.0	±17.0	6300	±1200
353362	35	CORE	Lead Loss	PS	5.2	±2.1	27	±10.0	132	±49	31.0	±12.0	4000	±1300
353362	35	RIM	Main Population	PS	5.8	±0.7	31	±3.6	228	±20	57.3	±4.8	12530	±390
353362	36	RIM	Main Population	PS	3.3	±0.3	18	±0.7	129	±2	32.3	±0.4	10720	±220
353362	37	RIM	Main Population	PS	3.9	±0.4	20	±1.2	166	±7	43.9	±2.0	11770	±290
353362	38	RIM	Rejected	PS	7.2	±1.8	33	±2.7	243	±14	61.9	±2.9	14660	±480
353362	39	RIM	Discordant	PS	3.9	±0.3	20	±0.7	152	±3	38.9	±0.8	11960	±350
353362	40	CORE	Discordant	PS	5.9	±0.5	29	±1.0	180	±5	45.6	±1.5	9370	±250
353362	40	RIM	Main Population	PS	4.3	±0.4	24	±0.8	176	±7	43.6	±1.7	12020	±380
353362	41	RIM	Main Population	PS	4.6	±0.4	23	±1.0	112	±4	25.3	±0.8	9950	±290
353362	41	CORE	Main Population	PS	7.9	±2.4	35	±10.0	173	±50	39.0	±11.0	5000	±1400
353362	42	RIM	Discordant	PS	18.9	±1.4	67	±4.4	251	±9	56.2	±1.8	10370	±320
353362	43	RIM	Main Population	PS	11.7	±1.1	47	±2.8	192	±8	42.3	±1.9	10310	±150
353362	44	RIM	Main Population	PS	5.0	±0.4	24	±0.7	124	±2	28.8	±0.5	9710	±300
353362	44	CORE	Lead Loss	PS	11.0	±2.0	50	±6.2	264	±26	62.3	±5.5	8545	±66
353362	46	RIM	Main Population	PS	4.3	±0.3	20	±0.6	126	±2	31.3	±0.6	9730	±350
353362	48	RIM	Main Population	PS	19.7	±1.5	74	±4.4	237	±9	50.4	±1.9	8020	±300
353362	49	RIM	Main Population	PS	8.6	±0.6	42	±1.2	225	±14	52.2	±3.5	9930	±210
353363	1	CORE	Main Population	PS	6.2	±0.8	26	±2.6	118	±9	26.4	±1.8	9660	±230
353363	1	RIM	Inherited	PS	7.4	±0.9	31	±1.5	126	±4	28.5	±1.0	7220	±200

Table A1. 4 continued: Zircon geochemistry for Gd, Dy, Yb, Lu, Hf. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	157 Gd		163 Dy		172 Yb		175 Lu		177 Hf	
353363	2	RIM	Inherited	PS	15.4	±1.2	62	±2.7	237	±13	53.8	±2.8	10430	±310
353363	3	RIM	Main Population	PS	4.7	±0.6	22	±0.8	123	±4	29.8	±1.0	10810	±560
353363	4	RIM	Main Population	PS	20.2	±0.8	76	±1.8	248	±7	52.3	±1.6	9330	±390
353363	5	RIM	Main Population	PS	7.4	±1.1	27	±2.9	150	±8	35.5	±2.5	11400	±1100
353363	6	RIM	Discordant	PS	18.8	±2.0	98	±8.1	501	±36	114.9	±7.8	11830	±390
353363	7	RIM	Inherited	PS	43.8	±1.2	172	±3.1	507	±10	101.9	±2.0	8340	±250
353363	8	RIM	Main Population	PS	13.0	±1.4	60	±5.5	310	±21	73.3	±4.7	11570	±410
353363	9	RIM	Main Population	PS	13.5	±1.2	66	±3.4	356	±21	86.1	±5.2	11600	±430
353363	10	RIM	Main Population	PS	20.3	±1.4	82	±2.9	353	±8	80.4	±1.8	11950	±400
353363	11	RIM	Main Population	PS	22.0	±2.8	90	±7.9	432	±31	100.6	±6.7	12430	±370
353363	12	RIM	Discordant	PS	13.7	±1.9	61	±4.3	316	±15	73.4	±4.1	11560	±550
353363	13	RIM	Main Population	PS	13.2	±1.0	58	±2.2	268	±5	60.7	±1.1	9350	±180
353363	14	RIM	Inherited	PS	4.0	±1.2	20	±5.7	149	±41	39.0	±11.0	8700	±2500
353363	15	RIM	Main Population	PS	24.2	±2.8	95	±7.8	308	±19	66.7	±3.6	10900	±200
353363	16	RIM	Discordant	PS	13.5	±1.0	57	±2.7	269	±8	63.2	±1.3	12860	±360
353363	17	RIM	Titanite/Apatite Inclusions	PS	8.5	±0.9	37	±2.2	216	±6	51.9	±1.4	12780	±190
353363	18	RIM	Discordant	PS	9.0	±0.9	40	±2.4	207	±7	50.0	±1.4	12350	±230
353363	19	RIM	Main Population	PS	13.8	±1.5	67	±4.9	362	±19	86.3	±4.1	11880	±390
353363	20	RIM	Main Population	PS	11.3	±1.7	56	±7.0	293	±33	68.5	±7.6	11390	±330
353363	21	RIM	Main Population	PS	11.2	±0.8	52	±1.9	275	±8	64.8	±2.0	9670	±170
353363	22	CORE	Inherited	PS	10.4	±1.1	42	±3.8	171	±14	38.5	±3.3	8650	±160
353363	22	RIM	Main Population	PS	6.7	±0.5	30	±0.9	146	±3	34.7	±0.7	10370	±280
353363	23	RIM	Main Population	PS	14.9	±1.5	66	±4.9	317	±21	72.9	±4.8	10940	±340
353363	25	RIM	Inherited	PS	14.2	±0.7	66	±2.2	329	±6	74.2	±1.3	10650	±330
353363	26	RIM	Rejected	PS	15.0	±2.4	61	±7.9	292	±29	69.6	±6.8	11210	±430
353363	27	RIM	Inherited	PS	11.0	±1.3	50	±4.4	273	±21	65.0	±4.3	9710	±530
353363	28	RIM	Main Population	PS	20.1	±1.0	92	±3.8	448	±28	102.6	±7.0	11500	±360
353363	29	RIM	Discordant	PS	3.2	±0.3	16	±0.6	103	±2	25.5	±0.6	10200	±320
353363	30	RIM	Inherited	PS	22.4	±1.1	92	±3.8	408	±15	91.1	±3.6	10280	±350
353363	31	RIM	Main Population	PS	29.2	±5.2	104	±16.0	413	±53	94.0	±12.0	10210	±230
353363	32	RIM	Discordant	PS	16.0	±2.5	64	±8.4	279	±26	63.5	±5.5	9690	±150

Table A1. 4 continued: Zircon geochemistry for Gd, Dy, Yb, Lu, Hf. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	157 Gd		163 Dy		172 Yb		175 Lu		177 Hf	
353363	33	RIM	Inherited	PS	54.3	±5.8	327	±33.0	1300	±160	262.0	±32.0	14240	±570
353363	34	RIM	Main Population	PS	14.4	±0.9	71	±3.2	338	±11	76.8	±2.6	11500	±360
353363	35	RIM	Main Population	PS	9.9	±0.7	43	±2.0	212	±7	49.3	±1.4	11640	±340
353363	36	RIM	Main Population	PS	11.3	±1.5	55	±7.3	312	±37	74.1	±8.3	11920	±480
353363	37	RIM	Main Population	PS	8.9	±0.9	41	±3.3	195	±14	45.6	±3.4	9540	±230
353363	38	RIM	Discordant	PS	6.7	±0.5	28	±0.9	127	±3	28.9	±0.7	10060	±260
353363	39	RIM	Main Population	PS	11.0	±0.8	55	±3.3	321	±15	75.8	±3.6	11220	±340
353363	40	RIM	Titanite/Apatite Inclusions	PS	20.0	±3.7	63	±4.9	273	±20	63.3	±4.7	11890	±760
353363	41	RIM	Main Population	PS	12.3	±3.0	55	±9.3	269	±39	63.1	±9.4	13540	±220
353363	42	RIM	Main Population	PS	10.8	±0.7	49	±2.6	222	±8	49.9	±1.5	9300	±250
353363	43	RIM	Inherited	PS	4.0	±0.4	19	±1.2	101	±5	24.3	±1.2	10170	±350
353363	44	RIM	Inherited	PS	14.4	±1.0	57	±3.4	222	±14	49.8	±3.1	8130	±210
353363	45	RIM	Inherited	PS	12.3	±3.9	50	±5.2	252	±24	60.2	±5.7	13100	±1200
353363	46	RIM	Rejected	PS	18.4	±2.5	74	±6.8	310	±28	72.4	±6.3	9290	±920
353363	47	CORE	Main Population	PS	23.8	±0.9	81	±2.3	237	±6	49.5	±1.2	8530	±210
353363	47	RIM	Main Population	PS	7.5	±0.8	34	±1.3	166	±5	39.7	±1.2	10800	±310
353363	48	RIM	Inherited	PS	15.0	±1.6	55	±4.9	201	±13	44.6	±2.9	8450	±250
353363	49	RIM	Main Population	PS	21.3	±1.3	71	±3.4	218	±9	46.4	±2.0	8840	±310
353368	1	RIM	Main Population	PS	5.3	±0.4	25	±0.8	157	±4	39.5	±1.1	10400	±290
353368	2	RIM	Main Population	PS	11.3	±0.8	44	±1.9	165	±5	36.4	±0.9	9390	±220
353368	3	RIM	Main Population	PS	33.2	±1.9	137	±6.9	494	±18	107.8	±3.8	8170	±230
353368	4	RIM	Main Population	PS	6.8	±0.4	30	±0.8	119	±3	26.3	±0.6	8950	±260
353368	5	CORE	Main Population	PS	8.2	±1.0	35	±3.2	154	±8	34.9	±1.5	9190	±230
353368	5	RIM	Main Population	PS	5.2	±0.4	25	±0.9	115	±4	25.9	±1.0	9680	±270
353368	6	RIM	Main Population	PS	6.6	±1.4	34	±6.9	181	±37	43.6	±8.9	5400	±1100
353368	7	RIM	Inherited	PS	22.0	±1.4	96	±4.2	451	±13	105.6	±2.7	9570	±340
353368	8	RIM	Main Population	PS	19.6	±0.9	77	±2.2	266	±7	58.0	±1.5	10370	±230
353368	9	RIM	Inherited	PS	7.6	±0.6	34	±1.7	155	±7	35.1	±1.6	8770	±130
353368	10	RIM	Main Population	PS	5.1	±0.4	23	±1.0	121	±5	29.6	±1.2	10130	±200
353368	10	CORE	Inherited	PS	14.5	±1.3	53	±3.6	186	±6	41.3	±0.8	11090	±250
353368	11	RIM	Main Population	PS	9.4	±0.7	38	±1.3	158	±3	35.2	±0.6	10730	±230

Table A1. 4 continued: Zircon geochemistry for Gd, Dy, Yb, Lu, Hf. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	157 Gd		163 Dy		172 Yb		175 Lu		177 Hf	
353368	12	RIM	Main Population	PS	6.4	±0.4	30	±0.8	172	±3	42.1	±0.6	9080	±220
353368	13	RIM	Inherited	PS	32.6	±3.8	121	±14.0	366	±36	76.2	±7.4	8480	±180
353368	14	RIM	Main Population	PS	14.1	±0.8	54	±1.8	192	±3	42.5	±0.6	8430	±210
353368	15	RIM	Discordant	PS	10.1	±0.6	40	±1.0	158	±2	34.7	±0.6	9940	±200
353368	16	RIM	Main Population	PS	7.1	±0.6	32	±2.4	154	±7	36.0	±1.7	10920	±330
353368	17	RIM	Main Population	PS	7.2	±0.5	30	±1.0	114	±2	24.7	±0.5	8080	±150
353368	18	RIM	Main Population	PS	18.5	±1.2	69	±3.4	242	±8	53.0	±1.8	9430	±290
353368	19	RIM	Main Population	PS	9.9	±2.9	53	±15.0	231	±66	51.0	±15.0	3700	±1100
353368	20	RIM	Main Population	PS	3.0	±1.4	15	±7.1	95	±44	23.0	±11.0	5300	±2600
353368	22	RIM	Discordant	PS	6.9	±0.5	33	±1.9	205	±10	50.2	±2.3	9510	±310
353368	23	RIM	Main Population	PS	11.6	±1.3	48	±4.9	191	±19	43.5	±4.3	8460	±850
353368	24	RIM	Main Population	PS	24.5	±2.0	88	±5.6	266	±14	55.6	±2.8	8910	±170
353368	25	RIM	Inherited	PS	5.2	±0.7	24	±2.9	113	±13	26.2	±3.0	8500	±1000
353368	26	RIM	Main Population	PS	5.4	±0.3	24	±1.0	101	±3	22.4	±0.8	8990	±220
353368	27	RIM	Main Population	PS	52.2	±2.8	192	±9.3	551	±25	113.7	±5.3	8220	±200
353368	28	RIM	Main Population	PS	5.1	±0.4	24	±0.7	133	±3	32.8	±0.8	9430	±220
353368	29	RIM	Lead Loss	PS	32.5	±2.1	128	±8.1	402	±22	84.3	±4.5	8940	±150
353368	30	RIM	Main Population	PS	3.8	±1.4	17	±5.8	77	±27	17.6	±6.0	4400	±1500
353368	31	RIM	Main Population	PS	8.8	±0.5	37	±1.2	146	±4	32.6	±0.8	8670	±250
353368	32	RIM	Main Population	PS	17.3	±1.1	83	±1.9	420	±6	93.0	±1.4	10480	±180
353368	33	RIM	Inherited	PS	18.8	±2.4	75	±9.2	249	±26	53.3	±5.4	9250	±180
353368	34	RIM	Main Population	PS	20.6	±2.6	80	±9.0	261	±27	55.2	±5.7	8840	±120
353368	35	RIM	Main Population	PS	5.7	±0.4	28	±0.8	165	±4	40.0	±0.9	10880	±270
353368	36	RIM	Main Population	PS	2.8	±0.7	13	±3.2	73	±18	17.6	±4.4	4400	±1100
353368	37	RIM	Main Population	PS	5.8	±0.4	29	±1.1	141	±3	32.1	±0.6	10240	±230
353368	38	RIM	Inherited	PS	6.5	±0.5	32	±1.8	184	±7	44.3	±1.5	9980	±300
353368	39	RIM	Inherited	PS	11.0	±0.8	50	±3.2	279	±14	68.1	±3.6	9110	±250
353368	40	RIM	Main Population	PS	3.9	±0.3	19	±0.8	109	±2	26.5	±0.5	10070	±220
353368	41	RIM	Main Population	PS	19.8	±1.7	75	±6.0	247	±16	52.1	±3.4	9280	±250
353368	42	RIM	Main Population	PS	4.9	±0.3	22	±0.6	118	±2	28.1	±0.4	9850	±280
353368	43	RIM	Discordant	PS	35.3	±2.0	135	±7.2	412	±23	87.2	±4.6	8760	±250

Table A1. 4 continued: Zircon geochemistry for Gd, Dy, Yb, Lu, Hf. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	157 Gd		163 Dy		172 Yb		175 Lu		177 Hf	
353368	44	RIM	Main Population	PS	38.9	±2.6	157	±7.5	534	±20	114.0	±4.0	9710	±230
353368	45	RIM	Main Population	PS	13.2	±0.9	60	±3.6	274	±15	62.7	±3.5	9240	±200
353368	46	RIM	Main Population	PS	26.9	±1.8	103	±4.3	339	±9	72.2	±1.6	10630	±370
353368	48	RIM	Main Population	PS	24.0	±1.5	85	±4.0	266	±9	56.0	±1.8	8070	±130
353368	49	RIM	Main Population	PS	4.8	±1.0	23	±5.0	110	±23	24.9	±5.1	5600	±1200
353369	1	RIM	Main Population	PS	11.3	±1.6	54	±2.0	286	±9	67.8	±1.6	9470	±130
353369	2	RIM	Main Population	PS	3.3	±0.3	15	±0.8	97	±4	25.0	±0.9	10350	±310
353369	2	CORE	Main Population	PS	15.7	±0.9	73	±2.7	353	±7	80.8	±1.4	9910	±190
353369	3	RIM	Main Population	PS	7.8	±0.6	37	±2.3	219	±14	53.9	±3.5	11180	±280
353369	4	RIM	Main Population	PS	7.3	±1.8	36	±8.6	180	±43	41.3	±9.8	6300	±1500
353369	5	RIM	Inherited	PS	8.6	±0.4	38	±0.9	157	±2	35.5	±0.5	9180	±280
353369	6	RIM	Main Population	PS	6.6	±0.4	31	±1.1	170	±5	41.9	±1.5	9570	±300
353369	7	RIM	Main Population	PS	34.1	±1.0	123	±3.1	346	±9	69.9	±1.9	8370	±240
353369	8	RIM	Main Population	PS	8.0	±0.5	35	±1.1	183	±4	43.8	±1.0	9150	±230
353369	9	RIM	Inherited	PS	4.3	±0.3	20	±1.1	122	±6	30.6	±1.4	8930	±200
353369	10	RIM	Main Population	PS	4.1	±0.3	22	±0.8	145	±5	36.1	±1.2	10640	±430
353369	11	RIM	Lead Loss	PS	8.0	±0.7	38	±1.6	197	±10	44.5	±2.8	9700	±280
353369	11	CORE	Main Population	PS	20.0	±2.1	77	±6.2	324	±18	74.7	±3.5	8140	±130
353369	12	RIM	Main Population	PS	4.5	±0.4	23	±1.0	141	±7	35.8	±1.6	9410	±250
353369	13	RIM	Inherited	PS	9.3	±1.0	50	±3.6	282	±16	69.7	±3.8	10180	±270
353369	14	RIM	Inherited	PS	5.8	±0.4	27	±1.3	164	±12	41.5	±3.4	9740	±300
353369	15	RIM	Main Population	PS	4.6	±0.3	25	±1.1	162	±6	40.9	±1.4	11160	±310
353369	16	RIM	Main Population	PS	5.5	±0.4	26	±0.8	154	±3	37.7	±0.9	9700	±320
353369	17	RIM	Main Population	PS	9.2	±1.5	50	±8.0	306	±50	71.0	±11.0	9920	±160
353369	18	RIM	Main Population	PS	6.9	±0.4	33	±0.8	165	±4	39.4	±1.0	8850	±270
353369	19	RIM	Lead Loss	PS	11.5	±0.6	48	±2.1	244	±6	57.7	±1.4	8900	±150
353369	20	RIM	Main Population	PS	8.8	±0.6	43	±1.1	239	±5	57.9	±1.3	9500	±320
353369	21	RIM	Titanite/Apatite Inclusions	PS	12.4	±2.6	28	±2.2	153	±5	38.1	±1.2	11350	±280
353369	22	RIM	Main Population	PS	8.2	±0.4	41	±1.1	248	±8	60.6	±2.1	9840	±260
353369	23	RIM	Main Population	PS	4.6	±0.4	24	±0.9	142	±4	34.4	±1.0	10510	±240
353369	24	RIM	Main Population	PS	3.9	±0.3	19	±0.6	115	±2	28.8	±0.7	11050	±310

Table A1. 4 continued: Zircon geochemistry for Gd, Dy, Yb, Lu, Hf. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	157 Gd		163 Dy		172 Yb		175 Lu		177 Hf	
353369	25	RIM	Main Population	PS	4.6	±0.4	24	±1.2	152	±7	37.7	±1.7	11780	±360
353369	26	RIM	Main Population	PS	5.6	±0.5	26	±1.1	145	±5	36.1	±1.2	9550	±280
353369	27	RIM	Inherited	PS	8.3	±0.5	40	±1.3	197	±7	45.8	±1.9	9430	±330
353369	28	RIM	Main Population	PS	4.3	±0.4	22	±1.2	138	±7	34.3	±1.7	10610	±310
353369	29	RIM	Main Population	PS	12.5	±0.8	56	±2.5	243	±10	55.2	±2.4	8480	±260
353369	30	RIM	Main Population	PS	7.3	±0.7	38	±2.2	245	±14	61.3	±3.7	10830	±230
353369	31	RIM	Main Population	PS	4.7	±0.7	26	±1.1	178	±4	42.2	±0.9	12330	±130
353369	32	RIM	Main Population	PS	39.6	±2.6	188	±9.5	886	±44	190.1	±9.3	10450	±260
353369	33	RIM	Main Population	PS	13.1	±3.1	53	±8.4	220	±28	51.6	±2.6	11080	±430
353369	34	RIM	Main Population	PS	4.2	±0.4	19	±0.7	118	±3	29.2	±0.7	9840	±290
353369	35	RIM	Main Population	PS	3.8	±0.3	18	±1.2	112	±7	27.8	±1.7	10250	±300
353369	36	RIM	Inherited	PS	18.1	±1.6	90	±5.8	412	±17	94.0	±3.4	10510	±190
353369	37	RIM	Main Population	PS	13.5	±1.1	61	±3.4	272	±8	61.8	±1.5	9790	±290
353369	38	RIM	Inherited	PS	8.0	±1.8	35	±7.6	152	±32	34.3	±7.3	7100	±1500
353369	39	RIM	Titanite/Apatite Inclusions	PS	20.0	±2.1	83	±7.1	367	±32	82.6	±7.4	8930	±460
353369	40	RIM	Main Population	PS	6.1	±1.6	29	±7.4	150	±39	37.2	±9.5	4300	±1100
353369	41	RIM	Main Population	PS	16.5	±1.6	74	±6.1	301	±15	68.3	±2.7	9900	±350
353369	42	RIM	Discordant	PS	4.1	±1.3	18	±5.5	78	±24	17.5	±5.3	5400	±1700
353369	43	RIM	Main Population	PS	4.3	±1.5	19	±6.2	99	±32	23.7	±7.6	4500	±1400
353369	44	RIM	Main Population	PS	4.3	±0.3	22	±0.8	131	±4	31.9	±0.9	10500	±260
353369	45	RIM	Main Population	PS	8.3	±0.5	40	±1.2	248	±5	62.6	±1.5	9390	±240
353369	46	RIM	Main Population	PS	6.5	±0.4	33	±1.1	203	±7	50.9	±1.9	9560	±240
353369	47	RIM	Main Population	PS	2.7	±0.6	13	±2.5	81	±15	19.7	±3.6	7000	±1300
353369	48	RIM	Inherited	PS	5.9	±0.4	28	±1.0	151	±3	37.1	±0.5	9870	±250
353369	49	RIM	Discordant	PS	7.1	±0.9	32	±3.1	151	±10	33.9	±2.1	12430	±170
353369	50	RIM	Discordant	PS	7.9	±0.5	36	±1.8	147	±6	33.2	±1.6	8870	±230
353369	51	RIM	Main Population	PS	18.8	±0.7	89	±1.6	413	±6	92.5	±1.6	10670	±290
353381	1	RIM	Discordant	UR	9.1	±1.3	39	±3.5	192	±15	44.3	±3.1	9880	±700
353381	2	RIM	Lead Loss	UR	31.7	±1.7	166	±7.0	786	±26	168.5	±5.1	10790	±170
353381	3	RIM	Lead Loss	UR	17.2	±1.0	86	±3.2	490	±12	117.4	±3.1	11290	±340
353381	4	RIM	Main Population	UR	25.0	±2.7	99	±9.2	423	±27	94.3	±6.2	10550	±240

Table A1. 4 continued: Zircon geochemistry for Gd, Dy, Yb, Lu, Hf. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	157 Gd		163 Dy		172 Yb		175 Lu		177 Hf	
353381	5	RIM	Main Population	UR	19.5	±1.5	99	±3.5	525	±15	118.6	±3.4	12550	±400
353381	6	RIM	Main Population	UR	9.7	±1.2	55	±5.5	359	±30	86.8	±7.4	12860	±320
353381	7	RIM	Inherited	UR	6.9	±0.8	36	±3.5	235	±21	57.2	±4.9	10240	±240
353381	8	RIM	Main Population	UR	24.7	±1.8	102	±5.2	469	±13	104.3	±2.3	9860	±280
353381	9	RIM	Titanite/Apatite Inclusions	UR	33.5	±3.0	127	±13.0	639	±55	142.0	±12.0	11410	±320
353381	10	CORE	Main Population	UR	19.0	±1.3	77	±2.6	301	±5	69.0	±1.0	7100	±270
353381	10	RIM	Inherited	UR	4.8	±1.8	26	±9.5	165	±64	39.0	±15.0	3700	±1400
353381	11	RIM	Inherited	UR	22.8	±1.0	90	±2.0	299	±4	61.4	±0.9	8330	±280
353381	12	RIM	Inherited	UR	16.7	±1.8	72	±6.3	284	±20	60.9	±4.2	11030	±190
353381	13	RIM	Titanite/Apatite Inclusions	UR	23.0	±31.0	61	±37.0	370	±130	94.0	±38.0	6200	±1700
353381	14	RIM	Main Population	UR	25.4	±2.4	102	±7.5	477	±41	110.4	±9.9	11990	±490
353381	15	RIM	Main Population	UR	25.6	±1.5	120	±6.0	507	±17	110.4	±3.8	9510	±280
353381	16	CORE	Inherited	UR	38.8	±3.1	137	±8.8	498	±25	109.0	±5.2	9580	±320
353381	16	RIM	Main Population	UR	10.0	±2.4	48	±11.0	239	±54	53.0	±12.0	5700	±1300
353381	17	RIM	Inherited	UR	58.6	±3.2	140	±6.0	334	±13	68.1	±2.5	6708	±76
353381	18	RIM	Inherited	UR	18.9	±1.4	91	±5.5	419	±21	94.2	±4.1	10240	±200
353381	18	RIM	Main Population	UR	29.2	±1.7	124	±4.9	564	±9	125.3	±2.3	11630	±330
353381	19	RIM	Lead Loss	UR	20.8	±1.8	116	±5.0	684	±15	159.9	±3.0	13530	±380
353381	20	RIM	Inherited	UR	15.3	±2.0	71	±6.8	298	±20	67.2	±3.9	10780	±210
353381	21	RIM	Main Population	UR	12.2	±0.9	57	±1.8	350	±7	83.2	±1.8	10460	±350
353381	23	RIM	Lead Loss	UR	27.4	±2.7	115	±6.4	563	±15	128.0	±3.4	10190	±250
353381	24	RIM	Main Population	UR	60.5	±2.2	265	±6.9	1038	±20	237.5	±4.7	6520	±260
353381	25	RIM	Lead Loss	UR	18.3	±1.5	92	±4.6	524	±19	123.4	±3.0	12170	±250
353381	26	RIM	Lead Loss	UR	27.7	±2.5	138	±4.1	721	±15	160.2	±2.0	12910	±250
353381	27	RIM	Main Population	UR	17.4	±2.8	68	±8.3	337	±28	78.0	±5.9	12180	±410
353381	28	RIM	Main Population	UR	28.1	±2.1	124	±7.7	557	±25	121.2	±5.4	12060	±410
353381	29	RIM	Main Population	UR	20.1	±1.5	80	±6.0	386	±18	88.9	±3.9	10250	±410
353381	30	RIM	Lead Loss	UR	21.4	±1.7	99	±5.3	498	±19	111.8	±4.1	11040	±240
353381	31	RIM	Discordant	UR	17.3	±1.4	72	±4.1	376	±15	89.1	±3.3	12630	±350
353381	32	RIM	Lead Loss	UR	21.0	±4.7	100	±16.0	669	±41	159.7	±5.5	14070	±430
353381	33	RIM	Inherited	UR	9.7	±1.0	49	±3.5	276	±16	62.6	±3.9	12500	±350

Table A1. 4 continued: Zircon geochemistry for Gd, Dy, Yb, Lu, Hf. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	157 Gd		163 Dy		172 Yb		175 Lu		177 Hf	
353381	33	RIM	Main Population	UR	20.4	±1.4	94	±3.4	434	±17	93.2	±3.6	12740	±440
353381	34	RIM	Rejected	UR	11.6	±2.6	64	±6.9	337	±56	80.0	±11.0	10890	±970
353381	35	RIM	Main Population	UR	22.1	±3.5	107	±13.0	491	±40	108.1	±8.4	11890	±340
353381	36	RIM	Main Population	UR	65.5	±6.3	145	±12.0	330	±17	68.2	±2.8	9970	±230
353381	37	RIM	Discordant	UR	22.3	±3.8	75	±6.8	401	±34	93.7	±8.2	11310	±930
353381	38	RIM	Main Population	UR	9.2	±1.1	47	±4.3	283	±23	66.7	±5.3	11430	±450
353381	39	RIM	Inherited	UR	14.3	±1.6	62	±3.8	351	±15	82.7	±3.1	11550	±360
353381	40	RIM	Lead Loss	UR	11.9	±0.7	58	±2.1	378	±10	91.0	±2.4	10890	±240
353381	41	RIM	Main Population	UR	34.8	±3.2	143	±12.0	657	±44	145.1	±9.9	10780	±340
353381	42	RIM	Rejected	UR	18.9	±1.5	59	±3.0	284	±18	65.5	±4.0	10640	±470
353381	42	RIM	Main Population	UR	21.9	±1.4	112	±3.2	597	±11	130.9	±2.6	12520	±430
353381	43	RIM	Rejected	UR	14.1	±5.0	56	±10.0	332	±49	78.0	±11.0	9900	±1400
353381	44	RIM	Main Population	UR	34.3	±1.0	145	±3.6	643	±19	147.6	±4.6	7930	±250
353381	45	RIM	Discordant	UR	18.7	±2.5	87	±3.6	442	±20	104.9	±4.7	11080	±670
353381	46	RIM	Inherited	UR	9.7	±3.7	50	±17.0	241	±81	54.0	±18.0	8000	±2500
353381	47	RIM	Main Population	UR	22.4	±2.1	96	±8.4	449	±28	98.3	±6.1	11330	±420
353381	48	RIM	Inherited	UR	19.1	±2.5	95	±12.0	435	±44	94.4	±8.9	10170	±170
353381	49	RIM	Lead Loss	UR	14.1	±0.8	58	±1.6	363	±6	89.0	±1.5	10520	±240
353384	1	RIM	Inherited	PB	27.8	±1.0	95	±3.2	247	±9	48.7	±1.8	8380	±240
353384	2	RIM	Titanite/Apatite Inclusions	PB	22.9	±2.1	78	±6.6	216	±16	43.2	±3.2	9060	±330
353384	3	RIM	Inherited	PB	14.2	±1.5	48	±3.9	209	±8	53.3	±2.4	11200	±160
353384	4	RIM	Main Population	PB	233.0	±18.0	781	±43.0	1400	±51	245.6	±7.9	11530	±180
353384	5	RIM	Main Population	PB	27.8	±1.8	95	±5.6	251	±12	50.4	±2.3	9000	±300
353384	6	RIM	Inherited	PB	7.2	±1.1	30	±4.0	232	±21	73.7	±5.4	22460	±690
353384	7	RIM	Inherited	PB	29.6	±2.0	93	±3.9	273	±8	57.8	±2.0	10510	±460
353384	8	RIM	Discordant	PB	62.8	±8.6	229	±25.0	556	±42	105.6	±7.9	12720	±340
353384	9	RIM	Inherited	PB	25.6	±1.8	94	±4.1	263	±6	53.3	±1.0	11930	±320
353384	10	RIM	Lead Loss	PB	19.5	±1.7	74	±4.6	218	±12	44.6	±2.9	10830	±780
353384	11	RIM	Inherited	PB	9.1	±0.5	33	±1.0	134	±4	29.4	±0.8	10100	±180
353384	12	RIM	Main Population	PB	43.8	±3.2	162	±7.5	452	±22	93.2	±5.5	10090	±240
353384	13	RIM	Discordant	PB	31.5	±1.2	101	±2.5	250	±5	50.1	±1.2	8620	±240

Table A1. 4 continued: Zircon geochemistry for Gd, Dy, Yb, Lu, Hf. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	157 Gd		163 Dy		172 Yb		175 Lu		177 Hf	
353384	13	CORE	Main Population	PB	31.4	±1.2	98	±3.0	241	±7	48.1	±1.3	9020	±270
353384	14	RIM	Discordant	PB	11.8	±0.8	45	±1.6	146	±4	30.1	±0.8	10360	±350
353384	15	RIM	Main Population	PB	32.3	±1.8	103	±4.6	254	±10	51.7	±2.0	10570	±310
353384	16	RIM	Main Population	PB	11.1	±0.8	45	±1.3	149	±3	31.0	±0.6	9580	±210
353384	17	RIM	Lead Loss	PB	25.6	±2.6	88	±8.2	237	±19	48.0	±3.7	9400	±270
353384	18	RIM	Inherited	PB	20.1	±2.4	65	±4.4	217	±14	47.8	±3.2	11640	±260
353384	19	RIM	Discordant	PB	14.9	±1.9	52	±5.5	146	±10	30.5	±2.1	9160	±370
353384	20	RIM	Inherited	PB	30.4	±6.0	95	±17.0	287	±42	60.7	±8.3	9710	±240
353385	1	RIM	Inherited	UR	8.5	±0.7	32	±2.3	135	±5	30.5	±1.0	10000	±200
353385	2	RIM	Main Population	UR	100.6	±2.5	352	±5.0	956	±15	194.3	±2.5	8190	±140
353385	3	RIM	Discordant	UR	3.4	±0.9	12	±3.0	51	±12	11.4	±2.7	5300	±1300
353385	4	RIM	Inherited	UR	4.4	±0.5	20	±1.1	108	±4	25.4	±0.9	9940	±130
353385	5	RIM	Inherited	UR	43.3	±7.1	137	±23.0	336	±46	65.8	±8.7	8908	±83
353385	6	RIM	Inherited	UR	18.3	±1.6	88	±6.9	391	±22	85.6	±4.7	8650	±160
353385	7	RIM	Inherited	UR	19.5	±2.3	60	±5.8	196	±14	42.6	±3.0	9760	±370
353385	8	RIM	Discordant	UR	277.0	±20.0	739	±55.0	1460	±110	268.0	±21.0	8990	±150
353385	9	RIM	Inherited	UR	72.6	±7.8	238	±24.0	693	±65	143.0	±13.0	7330	±150
353385	10	RIM	Main Population	UR	91.4	±4.2	302	±13.0	904	±34	185.7	±7.2	7370	±150
353385	11	RIM	Inherited	UR	5.8	±0.4	23	±0.9	100	±3	22.5	±0.7	9810	±240
353385	12	RIM	Rejected	UR	29.1	±2.7	89	±7.5	254	±17	53.5	±3.5	8410	±150
353385	12	RIM	Inherited	UR	6.2	±0.7	22	±2.5	110	±12	26.4	±2.9	9030	±940
353385	13	RIM	Inherited	UR	9.8	±0.8	41	±3.4	151	±10	33.3	±2.0	8940	±290
353385	14	RIM	Inherited	UR	29.2	±7.4	87	±20.0	233	±39	47.4	±7.8	10550	±120
353385	15	RIM	Lead Loss	UR	63.0	±15.0	200	±49.0	660	±160	140.0	±35.0	4100	±1100
353385	16	RIM	Inherited	UR	15.5	±2.5	50	±6.3	166	±14	36.5	±2.7	9110	±180
353385	17	RIM	Inherited	UR	4.0	±1.2	17	±4.9	62	±17	13.9	±3.9	5000	±1400
353385	18	RIM	Inherited	UR	1.5	±0.4	7	±1.8	33	±9	7.7	±2.1	4000	±1100
353385	19	RIM	Inherited	UR	36.5	±2.0	117	±4.6	334	±11	69.8	±2.2	9220	±280
353385	20	RIM	Main Population	UR	18.3	±1.3	79	±4.5	322	±19	70.3	±3.8	9030	±210
353385	21	RIM	Inherited	UR	7.7	±0.6	29	±1.1	117	±3	26.4	±0.6	9660	±260
353385	22	RIM	Main Population	UR	165.6	±3.5	506	±11.0	1170	±27	224.7	±5.4	7200	±120

Table A1. 4 continued: Zircon geochemistry for Gd, Dy, Yb, Lu, Hf. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	157 Gd		163 Dy		172 Yb		175 Lu		177 Hf	
353385	23	RIM	Inherited	UR	5.9	±1.1	23	±1.8	98	±4	20.9	±1.0	8200	±240
353385	24	RIM	Main Population	UR	13.2	±1.2	56	±3.3	231	±10	49.6	±2.2	8730	±150
353385	25	RIM	Inherited	UR	34.5	±2.9	105	±6.2	294	±13	62.2	±2.8	8960	±540
353385	26	RIM	Inherited	UR	3.3	±0.9	13	±3.5	62	±16	14.4	±3.8	3900	±1000
353385	27	CORE	Inherited	UR	24.7	±2.1	86	±5.9	268	±10	57.7	±2.6	8930	±140
353385	27	RIM	Inherited	UR	10.3	±0.8	41	±2.0	177	±5	39.4	±1.3	12690	±200
353385	28	RIM	Inherited	UR	18.8	±2.0	64	±5.7	209	±12	45.1	±2.5	10100	±120
353385	29	RIM	Main Population	UR	19.4	±1.2	84	±3.1	394	±9	87.7	±2.6	9290	±320
353385	30	RIM	Main Population	UR	12.8	±0.7	61	±1.6	328	±5	74.2	±1.1	8970	±220
353385	30	CORE	Inherited	UR	54.0	±21.0	172	±66.0	430	±160	85.0	±32.0	3200	±1100
353385	31	CORE	Inherited	UR	14.1	±1.8	52	±5.5	182	±13	40.2	±2.5	10840	±250
353385	31	RIM	Inherited	UR	19.5	±2.4	65	±7.4	211	±16	44.9	±2.8	10460	±260
353385	32	RIM	Rejected	UR	16.9	±1.0	67	±2.8	257	±11	56.3	±2.5	8570	±220
353385	33	RIM	Inherited	UR	12.0	±0.7	42	±1.4	181	±7	44.9	±2.3	11440	±270
353385	33	CORE	Lead Loss	UR	5.1	±0.4	20	±0.8	116	±6	30.0	±2.2	12700	±280
353385	34	RIM	Main Population	UR	62.3	±6.7	201	±19.0	629	±52	131.0	±10.0	8070	±190
353388	1	RIM	Main Population	PB	20.4	±1.1	83	±3.3	291	±10	61.7	±1.9	10220	±250
353388	2	RIM	Main Population	PB	10.3	±0.6	44	±1.5	152	±4	32.3	±0.7	9210	±180
353388	3	RIM	Main Population	PB	16.6	±2.3	62	±6.8	190	±14	39.2	±2.7	9580	±180
353388	4	RIM	Main Population	PB	18.3	±1.2	73	±3.6	242	±9	50.1	±1.8	8770	±160
353388	5	RIM	Main Population	PB	11.9	±0.7	51	±1.8	187	±6	39.9	±1.2	10210	±270
353388	6	RIM	Inherited	PB	22.8	±4.4	93	±16.0	326	±46	67.6	±9.2	10210	±200
353388	7	RIM	Discordant	PB	8.0	±0.5	36	±1.1	134	±3	29.1	±0.7	9530	±240
353388	8	RIM	Main Population	PB	9.3	±1.1	44	±4.2	163	±13	33.6	±2.8	10580	±200
353388	9	RIM	Discordant	PB	8.2	±0.5	35	±1.0	132	±3	28.3	±0.7	9180	±250
353388	10	RIM	Discordant	PB	11.6	±2.1	48	±7.1	159	±18	34.2	±3.7	10210	±270
353388	11	RIM	Main Population	PB	24.8	±2.2	95	±8.2	289	±25	58.9	±5.3	9100	±160
353388	12	RIM	Main Population	PB	21.5	±0.9	73	±3.0	195	±6	40.5	±1.4	10440	±270
353388	13	RIM	Discordant	PB	19.1	±1.3	70	±4.7	205	±12	42.6	±2.4	8380	±220
353388	14	RIM	Main Population	PB	10.6	±0.8	43	±1.6	161	±6	34.1	±1.2	10650	±300
353388	15	RIM	Main Population	PB	29.1	±1.4	111	±2.9	324	±7	66.0	±1.1	10950	±470

Table A1. 4 continued: Zircon geochemistry for Gd, Dy, Yb, Lu, Hf. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	157 Gd		163 Dy		172 Yb		175 Lu		177 Hf	
353388	16	RIM	Main Population	PB	24.6	±3.7	100	±13.0	310	±37	63.9	±7.1	10890	±250
353388	17	RIM	Inherited	PB	37.2	±1.6	129	±4.7	354	±13	70.4	±2.5	9800	±300
353388	19	RIM	Main Population	PB	14.3	±1.2	57	±3.9	178	±10	36.8	±2.0	8880	±240
353388	20	RIM	Main Population	PB	8.2	±0.4	35	±0.9	122	±3	25.7	±0.6	8680	±220
353388	21	RIM	Main Population	PB	29.5	±1.2	97	±2.5	264	±6	53.3	±1.2	9260	±260
353388	22	RIM	Main Population	PB	13.6	±0.6	50	±1.5	168	±4	36.5	±0.9	9120	±270
353388	23	RIM	Main Population	PB	29.0	±1.2	93	±3.2	238	±8	47.1	±1.7	8690	±220
353388	24	RIM	Main Population	PB	28.7	±1.1	97	±2.7	283	±9	58.7	±2.0	9010	±200
353388	25	RIM	Main Population	PB	9.0	±0.5	40	±1.3	151	±2	32.2	±0.6	8610	±170
353388	26	RIM	Discordant	PB	23.3	±1.3	87	±4.1	265	±11	54.8	±2.3	8530	±180
353388	27	RIM	Main Population	PB	11.4	±0.9	53	±2.0	218	±6	46.8	±1.1	11260	±200
353388	28	RIM	Discordant	PB	33.0	±2.1	115	±6.8	316	±18	63.1	±3.6	8890	±190
353388	29	RIM	Lead Loss	PB	14.0	±0.9	59	±2.7	226	±10	46.0	±2.0	10263	±73
353388	30	RIM	Discordant	PB	22.2	±2.5	77	±4.7	236	±10	48.0	±1.8	8700	±130
353388	31	RIM	Main Population	PB	17.6	±2.2	68	±6.3	229	±14	48.5	±2.9	9500	±240
353388	32	RIM	Discordant	PB	14.7	±6.2	48	±20.0	131	±54	27.0	±11.0	4700	±2000
353388	33	RIM	Main Population	PB	8.6	±0.6	43	±1.4	183	±5	39.3	±1.1	12350	±330
353388	34	RIM	Main Population	PB	47.2	±3.4	201	±13.0	628	±33	130.2	±6.7	9400	±180
353388	35	RIM	Main Population	PB	16.1	±1.3	65	±4.2	219	±11	45.7	±2.4	10260	±290
353388	36	RIM	Main Population	PB	11.4	±0.9	51	±1.5	178	±4	38.7	±0.9	10820	±320
353388	37	RIM	Lead Loss	PB	9.4	±4.7	32	±17.0	82	±49	17.0	±10.0	3200	±2000
353388	38	RIM	Main Population	PB	7.6	±0.5	36	±1.0	141	±4	30.3	±0.7	9470	±260
353388	39	RIM	Main Population	PB	12.0	±0.7	51	±1.9	180	±5	38.4	±1.1	9330	±270
353388	40	RIM	Main Population	PB	9.6	±0.9	46	±1.8	190	±4	41.2	±0.7	12860	±220
353388	41	RIM	Titanite/Apatite Inclusions	PB	30.2	±1.4	89	±2.9	242	±7	48.8	±1.6	9680	±350
353388	42	RIM	Rejected	PB	18.9	±3.0	67	±7.2	207	±19	43.3	±4.0	9010	±910
353388	43	RIM	Main Population	PB	10.0	±0.7	42	±1.8	147	±5	30.7	±1.0	9570	±220
353388	44	RIM	Lead Loss	PB	7.5	±0.5	34	±1.4	138	±5	29.5	±1.2	9040	±220
353388	45	RIM	Main Population	PB	11.1	±0.9	54	±2.1	217	±7	45.3	±1.3	13100	±410
353388	46	RIM	Main Population	PB	7.6	±0.6	36	±1.5	142	±5	30.6	±1.0	10430	±280
353388	47	RIM	Titanite/Apatite Inclusions	PB	27.6	±3.9	75	±6.1	190	±7	39.3	±1.3	9410	±180

Table A1. 4 continued: Zircon geochemistry for Gd, Dy, Yb, Lu, Hf. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	157 Gd		163 Dy		172 Yb		175 Lu		177 Hf	
353388	48	RIM	Main Population	PB	8.1	±0.7	37	±1.4	145	±4	31.5	±0.9	9060	±440
353388	49	RIM	Main Population	PB	23.9	±0.7	86	±1.9	241	±6	48.3	±1.1	9250	±270
353388	50	RIM	Inherited	PB	22.0	±1.5	70	±3.1	200	±7	41.1	±1.4	7590	±63
353390	1	RIM	Titanite/Apatite Inclusions	PB	10.9	±1.0	40	±1.0	160	±2	33.9	±0.5	10010	±260
353390	2	CORE	Inherited	PB	16.2	±0.7	51	±1.3	150	±4	31.6	±0.9	8530	±220
353390	2	RIM	Inherited	PB	3.1	±0.4	15	±0.6	93	±2	24.1	±0.6	14100	±560
353390	3	RIM	Discordant	PB	23.5	±2.6	94	±9.1	391	±33	85.5	±6.7	11420	±520
353390	4	RIM	Main Population	PB	17.5	±2.5	87	±5.9	410	±32	94.4	±7.0	11140	±890
353390	5	RIM	Main Population	PB	24.8	±1.3	91	±3.6	275	±7	57.3	±1.5	9640	±220
353390	6	RIM	Lead Loss	PB	10.1	±2.9	53	±15.0	262	±75	59.0	±17.0	7300	±2100
353390	7	RIM	Lead Loss	PB	13.2	±1.0	59	±3.2	266	±10	59.2	±2.1	10780	±270
353390	8	RIM	Main Population	PB	19.5	±1.5	93	±4.1	439	±11	95.6	±1.8	11540	±280
353390	9	RIM	Titanite/Apatite Inclusions	PB	11.3	±0.6	52	±2.0	242	±7	53.5	±1.3	10900	±280
353390	10	RIM	Main Population	PB	7.3	±0.6	36	±2.2	165	±7	36.9	±1.4	9880	±170
353390	11	RIM	Discordant	PB	15.6	±1.1	61	±3.5	192	±8	40.1	±1.6	9760	±290
353390	12	RIM	Main Population	PB	8.9	±0.6	38	±1.5	137	±4	29.1	±0.6	9340	±280
353390	13	CORE	Discordant	PB	14.6	±1.3	57	±3.6	203	±9	43.2	±1.9	10030	±170
353390	13	RIM	Main Population	PB	13.4	±0.6	66	±1.2	347	±4	78.6	±1.0	10400	±320
353390	14	RIM	Lead Loss	PB	14.1	±0.8	59	±2.1	223	±10	47.8	±2.3	10030	±190
353390	15	RIM	Main Population	PB	5.6	±0.5	27	±0.9	117	±3	26.1	±0.6	10560	±270
353390	16	RIM	Main Population	PB	9.0	±0.6	40	±1.2	155	±4	32.9	±0.7	9520	±270
353390	17	RIM	Discordant	PB	14.6	±2.1	76	±5.9	424	±33	97.3	±7.9	12810	±400
353390	18	RIM	Lead Loss	PB	19.0	±1.8	95	±6.4	478	±22	109.1	±4.7	12450	±290
353390	19	RIM	Main Population	PB	6.1	±0.4	28	±1.3	116	±3	25.2	±0.8	9330	±220
353390	20	RIM	Main Population	PB	12.2	±1.1	62	±3.7	300	±17	66.4	±3.7	11560	±290
353390	21	RIM	Main Population	PB	9.9	±0.5	40	±1.3	140	±4	29.9	±0.9	8790	±270
353390	22	RIM	Main Population	PB	7.7	±0.5	35	±1.2	158	±3	34.9	±0.6	9840	±190
353390	23	RIM	Main Population	PB	14.1	±1.2	71	±2.4	409	±10	93.5	±2.3	13030	±200
353390	24	RIM	Lead Loss	PB	17.1	±2.4	71	±10.0	174	±26	34.6	±5.2	7700	±1200
353390	25	RIM	Main Population	PB	12.9	±1.0	59	±2.5	246	±9	54.0	±2.1	10520	±370
353390	26	RIM	Inherited	PB	8.4	±0.5	37	±1.5	150	±5	32.8	±1.2	10270	±360

Table A1. 4 continued: Zircon geochemistry for Gd, Dy, Yb, Lu, Hf. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	157 Gd		163 Dy		172 Yb		175 Lu		177 Hf	
353390	27	RIM	Lead Loss	PB	8.2	±0.8	38	±2.1	188	±6	44.2	±1.4	11690	±180
353390	28	RIM	Main Population	PB	13.3	±2.5	62	±11.0	297	±53	66.0	±12.0	8400	±1500
353390	29	RIM	Discordant	PB	7.9	±0.7	41	±3.2	230	±15	54.9	±3.1	10430	±300
353390	30	RIM	Main Population	PB	8.9	±0.5	44	±1.1	213	±5	47.2	±1.2	10510	±280
353390	31	RIM	Main Population	PB	20.5	±2.0	74	±5.7	234	±14	49.2	±2.8	9840	±240
353390	32	RIM	Main Population	PB	10.9	±0.8	53	±1.6	217	±5	46.1	±0.8	13800	±410
353390	33	CORE	Main Population	PB	24.4	±1.4	92	±4.6	297	±17	62.6	±3.8	8820	±120
353390	33	MID	Main Population	PB	19.7	±1.6	76	±5.2	254	±17	53.5	±3.6	9120	±150
353390	33	RIM	Main Population	PB	21.4	±1.0	101	±2.2	484	±9	108.2	±2.2	11230	±320
353390	34	RIM	Main Population	PB	24.7	±1.4	98	±4.3	340	±17	71.5	±3.8	10400	±260
353390	35	RIM	Main Population	PB	9.7	±0.6	48	±1.8	254	±9	58.2	±1.9	10600	±240
353390	36	RIM	Discordant	PB	9.4	±0.6	49	±1.2	273	±5	61.4	±1.0	11460	±350
353390	37	RIM	Main Population	PB	18.2	±2.5	80	±5.9	423	±23	92.3	±6.0	10700	±1000
353390	38	RIM	Lead Loss	PB	22.9	±1.0	91	±3.5	319	±9	66.8	±1.7	9980	±250
353390	39	RIM	Main Population	PB	16.5	±3.5	66	±13.0	241	±44	50.6	±9.3	9500	±1600
353390	40	CORE	Inherited	PB	18.7	±1.2	66	±3.7	193	±10	40.5	±2.0	8800	±220
353390	40	RIM	Main Population	PB	8.1	±0.5	35	±1.0	138	±4	29.8	±0.8	10000	±280
353390	41	RIM	Lead Loss	PB	3.2	±1.0	14	±4.0	54	±15	11.9	±3.2	4200	±1200
353390	42	RIM	Discordant	PB	33.7	±6.7	146	±27.0	576	±84	123.0	±17.0	13000	±360
353390	43	RIM	Main Population	PB	18.5	±1.9	67	±3.9	243	±8	52.4	±1.6	10810	±110
353390	44	RIM	Inherited	PB	4.9	±0.4	23	±1.0	114	±4	26.5	±0.9	10610	±230
353390	44	CORE	Inherited	PB	15.6	±0.7	66	±2.1	224	±5	47.5	±1.1	8010	±160
353390	45	RIM	Inherited	PB	18.7	±2.0	81	±7.3	345	±26	75.5	±5.6	10710	±250
353390	46	RIM	Main Population	PB	9.8	±0.8	52	±1.5	283	±9	64.5	±1.9	12480	±310
353390	47	RIM	Main Population	PB	3.7	±0.4	18	±1.2	92	±4	20.9	±0.9	10700	±240
353390	48	RIM	Discordant	PB	12.9	±0.6	61	±1.8	256	±6	56.3	±1.4	10940	±290
353390	48	CORE	Main Population	PB	5.8	±0.4	27	±0.9	122	±3	26.7	±0.6	9990	±240
353393	1	RIM	Main Population	TYC	20.4	±1.0	79	±1.9	314	±6	72.5	±1.4	11290	±380
353393	2	RIM	Main Population	TYC	8.9	±1.5	33	±2.9	182	±12	46.3	±3.3	12700	±540
353393	3	RIM	Discordant	TYC	5.7	±0.7	23	±2.0	164	±11	46.5	±3.3	11990	±620
353393	4	RIM	Discordant	TYC	14.4	±1.3	60	±4.9	252	±16	60.4	±3.4	10880	±300

Table A1. 4 continued: Zircon geochemistry for Gd, Dy, Yb, Lu, Hf. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	157 Gd		163 Dy		172 Yb		175 Lu		177 Hf	
353393	5	RIM	Main Population	TYC	9.1	±0.6	33	±1.7	168	±6	44.2	±1.4	11410	±340
353393	6	CORE	Inherited	TYC	10.6	±1.1	44	±4.6	194	±17	43.5	±3.5	9960	±290
353393	6	RIM	Main Population	TYC	6.1	±0.4	25	±1.0	137	±5	37.2	±1.4	11210	±330
353393	7	RIM	Discordant	TYC	11.3	±1.0	39	±2.7	196	±9	50.4	±2.1	11120	±270
353393	8	CORE	Main Population	TYC	11.5	±0.7	45	±1.4	198	±5	47.8	±1.2	10740	±210
353393	8	RIM	Discordant	TYC	7.4	±1.4	34	±5.4	168	±26	42.9	±6.6	7400	±1100
353393	9	RIM	Lead Loss	TYC	7.9	±0.9	36	±1.9	236	±6	64.4	±1.3	12060	±260
353393	10	RIM	Main Population	TYC	8.6	±2.0	30	±6.9	103	±24	23.2	±5.4	4200	±1000
353393	11	RIM	Inherited	TYC	4.1	±0.6	23	±1.2	110	±3	23.9	±0.7	10840	±230
353393	12	RIM	Discordant	TYC	18.5	±1.0	79	±3.0	340	±8	80.0	±2.1	11820	±320
353393	13	RIM	Main Population	TYC	14.5	±1.5	58	±4.9	275	±13	67.3	±2.8	11520	±400
353393	14	RIM	Main Population	TYC	9.2	±0.9	38	±1.4	266	±10	72.7	±2.6	13210	±360
353393	15	RIM	Inherited	TYC	10.9	±1.2	41	±3.8	201	±16	50.8	±4.3	11650	±320
353393	16	RIM	Main Population	TYC	8.5	±1.0	36	±2.9	189	±8	49.4	±1.4	12030	±290
353393	17	RIM	Lead Loss	TYC	12.6	±0.6	52	±1.3	148	±3	30.1	±0.5	7200	±230
353393	17	CORE	Lead Loss	TYC	30.1	±1.6	93	±3.7	201	±8	39.5	±1.5	7080	±190
353393	18	RIM	Inherited	TYC	8.0	±1.5	28	±3.9	164	±14	43.0	±4.3	8380	±500
353393	19	RIM	Main Population	TYC	4.0	±0.7	19	±4.0	163	±15	47.8	±3.0	13200	±430
353393	20	RIM	Main Population	TYC	6.0	±0.4	25	±1.1	160	±5	43.5	±1.4	11050	±350
353393	21	RIM	Main Population	TYC	17.9	±1.1	77	±5.0	287	±19	62.9	±4.3	11270	±390
353393	22	RIM	Discordant	TYC	13.7	±1.2	52	±5.2	219	±11	53.0	±2.7	11240	±500
353393	23	RIM	Main Population	TYC	16.2	±2.1	61	±7.0	292	±23	74.1	±5.4	12690	±270
353393	24	RIM	Main Population	TYC	9.2	±0.5	39	±1.1	237	±5	63.1	±1.4	11280	±360
353393	25	RIM	Inherited	TYC	6.9	±2.1	26	±4.9	188	±21	55.2	±5.4	13600	±1500
353393	26	RIM	Main Population	TYC	11.1	±0.7	48	±1.8	266	±9	64.6	±2.0	10370	±360
353393	27	RIM	Main Population	TYC	11.4	±1.0	48	±2.6	236	±10	56.7	±2.5	9140	±290
353393	28	RIM	Main Population	TYC	27.0	±4.8	91	±15.0	329	±34	75.0	±6.9	11820	±450
353393	29	RIM	Main Population	TYC	9.4	±2.2	35	±2.1	237	±14	68.4	±2.9	15790	±620
353393	30	RIM	Inherited	TYC	8.0	±0.8	37	±1.9	164	±8	37.0	±1.8	9380	±320
353393	31	RIM	Main Population	TYC	4.5	±0.4	17	±1.3	115	±8	31.1	±2.2	11320	±350
353393	31	CORE	Discordant	TYC	9.9	±0.7	34	±1.1	139	±3	31.2	±0.6	10820	±320

Table A1. 4 continued: Zircon geochemistry for Gd, Dy, Yb, Lu, Hf. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	157 Gd		163 Dy		172 Yb		175 Lu		177 Hf	
353393	32	RIM	Inherited	TYC	27.3	±2.2	78	±5.0	197	±10	43.5	±2.2	9670	±300
353393	33	CORE	Main Population	TYC	3.8	±0.5	17	±1.4	149	±10	44.4	±2.8	11720	±520
353393	33	RIM	Main Population	TYC	6.2	±0.6	28	±1.5	204	±9	57.9	±2.4	11830	±460
353393	34	RIM	Discordant	TYC	10.7	±0.7	49	±2.4	265	±21	69.0	±5.8	11720	±610
353393	35	RIM	Inherited	TYC	11.4	±1.9	54	±8.9	250	±38	60.6	±8.6	13980	±510
353393	36	RIM	Main Population	TYC	8.5	±0.6	34	±1.7	200	±7	53.5	±1.7	10720	±320
353393	37	RIM	Main Population	TYC	14.2	±1.3	51	±2.2	249	±6	64.7	±1.6	11700	±460
353393	38	RIM	Inherited	TYC	7.2	±1.3	31	±3.8	182	±8	49.9	±2.3	13230	±550
353393	39	RIM	Main Population	TYC	10.4	±1.7	43	±5.5	209	±18	54.5	±4.2	12910	±330
353393	40	RIM	Main Population	TYC	8.3	±0.5	40	±1.3	241	±3	63.2	±0.7	11390	±370
353393	41	CORE	Main Population	TYC	11.3	±1.2	48	±4.0	227	±13	55.6	±2.6	11080	±350
353393	41	RIM	Main Population	TYC	11.5	±1.2	51	±4.3	269	±14	65.7	±2.5	10260	±220
353393	42	RIM	Main Population	TYC	3.5	±0.3	16	±0.5	127	±3	36.9	±0.8	11530	±390
353393	42	CORE	Inherited	TYC	3.9	±0.7	20	±1.3	152	±4	42.9	±1.1	9210	±230
353393	43	RIM	Inherited	TYC	9.7	±2.3	37	±7.9	186	±23	47.9	±4.8	12350	±360
353393	44	RIM	Inherited	TYC	16.5	±1.6	69	±4.9	305	±12	73.8	±2.1	10420	±260
353393	45	RIM	Main Population	TYC	10.4	±1.0	46	±1.9	233	±6	59.3	±1.2	12860	±300
353393	46	RIM	Inherited	TYC	12.7	±0.9	41	±1.3	160	±4	38.3	±0.8	9860	±140
353393	46	CORE	Inherited	TYC	21.4	±1.9	75	±4.7	288	±11	68.1	±2.5	11200	±380
353393	47	RIM	Inherited	TYC	4.0	±0.4	19	±0.8	134	±3	37.6	±0.7	10720	±240
353393	47	CORE	Lead Loss	TYC	32.3	±0.9	102	±3.1	313	±7	66.8	±1.2	9610	±170
353393	48	CORE	Inherited	TYC	6.0	±0.6	24	±1.5	138	±8	37.0	±2.0	11250	±320
353393	48	RIM	Main Population	TYC	7.1	±0.6	28	±2.2	138	±12	35.4	±3.2	11090	±310
353393	48	CORE	Main Population	TYC	8.3	±1.1	37	±4.1	205	±16	53.9	±3.3	12430	±480
353393	49	RIM	Discordant	TYC	4.0	±0.7	17	±2.7	146	±21	42.5	±6.5	14980	±430
353393	49	CORE	Discordant	TYC	87.4	±3.9	291	±11.0	751	±19	148.8	±3.9	6380	±240
353393	50	RIM	Lead Loss	TYC	21.5	±2.2	87	±6.2	312	±17	69.7	±2.7	9980	±230
353393	50	CORE	Lead Loss	TYC	17.8	±2.8	66	±7.0	245	±13	54.3	±2.7	9110	±420
353393	51	RIM	Inherited	TYC	10.7	±1.0	41	±2.3	204	±8	53.6	±3.1	13090	±390
353393	51	CORE	Main Population	TYC	18.5	±1.2	71	±3.0	312	±7	70.3	±1.4	9320	±230
353393	51	MID	Inherited	TYC	18.5	±1.4	65	±4.0	247	±13	54.9	±2.8	9690	±190

Table A1. 4 continued: Zircon geochemistry for Gd, Dy, Yb, Lu, Hf. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	157 Gd		163 Dy		172 Yb		175 Lu		177 Hf	
353393	52	MID	Main Population	TYC	6.0	±0.5	25	±1.1	119	±4	29.2	±0.8	11780	±320
353393	52	CORE	Inherited	TYC	11.7	±0.9	44	±2.9	200	±12	47.1	±2.6	8580	±260
353393	52	RIM	Discordant	TYC	5.9	±0.5	25	±1.0	160	±6	43.2	±1.6	11250	±340
353393	53	RIM	Inherited	TYC	21.1	±1.3	86	±3.6	331	±9	72.7	±1.6	10100	±330
353393	54	RIM	Discordant	TYC	14.6	±1.7	54	±3.4	221	±10	51.0	±2.6	11090	±200

Table A1. 5: Zircon geochemistry for Pb, Th, U and Ce and Eu anomalies. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	206 Pb		232 Th		238 U		Ce anomaly	Eu anomaly
353353	1	RIM	Lead Loss	PB	1.1	±0.1	22.4	±0.4	38	±1		0.33
353353	2	RIM	Lead Loss	PB	1.5	±0.1	57.5	±1.1	54	±1		0.35
353353	3	RIM	Lead Loss	PB	2.6	±0.6	79.0	±20.0	109	±27	73	0.41
353353	4	RIM	Lead Loss	PB	1.6	±0.2	29.3	±1.4	55	±2	94	0.30
353353	5	RIM	Lead Loss	PB	4.2	±0.2	119.1	±1.4	159	±3	35	0.44
353353	6	RIM	Main Population	PB	1.4	±0.1	30.2	±1.3	48	±2		0.34
353353	7	RIM	Main Population	PB	6.1	±0.3	118.3	±7.6	209	±8	94	0.31
353353	8	RIM	Main Population	PB	3.7	±0.2	109.7	±4.3	119	±4	26	0.33
353353	9	RIM	Main Population	PB	2.8	±0.5	68.8	±5.5	110	±12		0.26
353353	10	RIM	Discordant	PB	10.3	±0.5	257.8	±8.4	388	±7	205	0.29
353353	11	RIM	Main Population	PB	1.7	±0.1	45.3	±1.4	55	±1		0.42
353353	12	RIM	Main Population	PB	1.3	±0.1	29.9	±1.5	43	±3		0.31
353353	13	RIM	Main Population	PB	2.5	±0.2	75.3	±2.9	81	±4	56	0.37
353353	14	RIM	Main Population	PB	1.7	±0.1	57.9	±1.9	58	±1	57	0.30
353353	15	RIM	Lead Loss	PB	1.7	±0.2	42.9	±2.7	61	±2	42	0.54
353353	16	RIM	Main Population	PB	3.4	±0.2	64.3	±2.2	113	±3		0.27
353353	17	RIM	Lead Loss	PB	1.6	±0.2	40.9	±1.8	63	±2	199	0.32
353353	18	RIM	Main Population	PB	2.5	±0.1	79.5	±6.7	89	±4	65	0.34
353353	19	RIM	Discordant	PB	9.3	±0.7	248.2	±5.0	347	±9	107	0.40
353353	20	RIM	Main Population	PB	3.2	±0.3	100.4	±4.8	115	±7	65	0.40
353353	21	RIM	Main Population	PB	2.0	±0.2	52.7	±7.8	68	±6	87	0.34
353353	22	RIM	Main Population	PB	1.3	±0.1	42.6	±2.9	44	±2	79	0.38
353353	23	RIM	Lead Loss	PB	1.2	±0.1	28.0	±0.7	42	±1	194	0.35
353353	24	RIM	Main Population	PB	1.0	±0.1	22.9	±0.6	34	±1		0.30
353353	25	RIM	Main Population	PB	2.1	±0.2	78.2	±2.0	75	±1		0.34
353353	26	RIM	Lead Loss	PB	5.3	±0.4	158.0	±9.0	220	±8	121	0.34
353353	27	RIM	Main Population	PB	5.6	±0.4	126.6	±5.9	172	±6	177	0.34
353353	28	RIM	Lead Loss	PB	1.0	±0.2	36.3	±9.7	50	±14	53	0.41
353353	29	RIM	Discordant	PB	1.4	±0.1	33.2	±0.9	48	±1	122	0.32
353353	30	RIM	Lead Loss	PB	5.7	±0.9	82.7	±9.8	205	±30		0.30
353353	31	RIM	Main Population	PB	1.0	±0.1	24.7	±0.6	33	±1		0.29

Table A1. 5 continued: Zircon geochemistry for Pb, Th, U and Ce and Eu anomalies. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	206 Pb		232 Th		238 U		Ce anomaly	Eu anomaly
353353	32	RIM	Lead Loss	PB	3.4	±0.3	64.1	±6.5	116	±9	205	0.31
353353	33	RIM	Main Population	PB	1.8	±0.2	55.2	±6.0	61	±5	49	0.38
353353	34	RIM	Main Population	PB	1.7	±0.1	34.6	±1.2	54	±1		0.33
353353	35	RIM	Discordant	PB	1.3	±0.1	43.9	±1.7	44	±1		0.32
353353	36	RIM	Lead Loss	PB	1.7	±0.1	53.0	±1.4	67	±1	24	0.51
353353	37	RIM	Inherited	PB	8.0	±0.7	122.0	±10.0	212	±18	61	0.25
353353	38	RIM	Lead Loss	PB	7.7	±0.4	191.3	±8.2	307	±14	354	0.31
353353	39	RIM	Main Population	PB	3.1	±0.2	64.9	±5.1	102	±5	135	0.35
353353	40	RIM	Lead Loss	PB	2.3	±0.1	71.0	±1.9	82	±2	103	0.28
353353	41	RIM	Discordant	PB	3.1	±0.2	55.8	±0.9	98	±1	125	0.36
353353	42	RIM	Main Population	PB	4.2	±0.4	117.5	±7.8	149	±11		0.24
353353	43	RIM	Main Population	PB	2.7	±0.5	48.9	±6.7	93	±18	45	0.42
353353	44	RIM	Titanite/Apatite Inclusions	PB	7.8	±0.8	167.0	±14.0	236	±20	8	0.32
353353	45	RIM	Discordant	PB	3.4	±1.0	121.0	±41.0	138	±43	118	0.29
353353	46	RIM	Discordant	PB	1.2	±0.1	29.2	±1.2	43	±1	79	0.30
353353	47	RIM	Main Population	PB	1.3	±0.2	31.5	±1.3	37	±1	15	0.31
353353	48	RIM	Main Population	PB	2.7	±0.2	47.7	±0.8	85	±1	127	0.34
353353	49	RIM	Main Population	PB	1.9	±0.1	41.7	±2.1	65	±3		0.30
353355	1	RIM	Main Population	PB	3.5	±0.3	67.8	±2.8	129	±10		0.17
353355	2	RIM	Main Population	PB	2.0	±0.5	43.0	±10.0	68	±15		0.40
353355	3	RIM	Main Population	PB	1.7	±0.2	55.6	±5.2	63	±5	30	0.40
353355	4	RIM	Lead Loss	PB	1.9	±0.1	52.9	±1.6	71	±2		0.25
353355	5	RIM	Discordant	PB	1.3	±0.1	29.2	±1.2	41	±1		0.39
353355	6	RIM	Discordant	PB	1.9	±0.1	61.3	±2.4	65	±2	147	0.32
353355	7	RIM	Main Population	PB	1.3	±0.1	23.3	±0.8	44	±2		0.27
353355	8	RIM	Main Population	PB	0.8	±0.2	24.5	±7.0	30	±8	55	0.34
353355	9	RIM	Inherited	PB	1.6	±0.1	50.2	±1.5	53	±1	134	0.33
353355	10	RIM	Main Population	PB	2.2	±0.6	61.0	±11.0	74	±16		0.33
353355	10	CORE	Main Population	PB	7.8	±0.9	127.0	±18.0	288	±24	140	0.40
353355	11	RIM	Main Population	PB	1.6	±0.1	54.8	±1.8	58	±1		0.35
353355	12	RIM	Main Population	PB	1.6	±0.1	63.9	±3.1	58	±2	75	0.33

Table A1. 5 continued: Zircon geochemistry for Pb, Th, U and Ce and Eu anomalies. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	206 Pb		232 Th		238 U		Ce anomaly	Eu anomaly
353355	13	RIM	Main Population	PB	1.4	±0.1	49.8	±2.8	53	±1		0.30
353355	14	CORE	Main Population	PB	0.9	±0.1	23.3	±0.5	33	±1		0.42
353355	14	MID	Main Population	PB	0.9	±0.1	23.2	±0.6	32	±1		0.40
353355	14	MID	Lead Loss	PB	0.9	±0.1	23.2	±0.6	35	±1		0.38
353355	14	RIM	Discordant	PB	1.6	±0.1	35.1	±1.2	53	±1		0.38
353355	15	RIM	Main Population	PB	5.5	±1.2	138.0	±16.0	205	±40	142	0.30
353355	16	RIM	Main Population	PB	2.0	±0.1	41.9	±1.6	65	±2		0.35
353355	17	RIM	Main Population	PB	1.2	±0.1	33.1	±1.0	41	±1		0.33
353355	18	RIM	Main Population	PB	3.2	±0.2	70.0	±3.6	114	±4	131	0.48
353355	19	RIM	Lead Loss	PB	1.1	±0.1	27.7	±0.7	42	±0		0.37
353355	20	RIM	Main Population	PB	1.3	±0.1	39.3	±1.4	46	±1	164	0.38
353355	21	CORE	Inherited	PB	33.8	±0.8	36.1	±2.3	121	±5	32	0.28
353355	21	RIM	Inherited	PB	27.0	±0.4	28.4	±0.9	98	±3		0.26
353355	22	RIM	Main Population	PB	1.6	±0.1	46.0	±2.0	53	±1		0.33
353355	23	RIM	Inherited	PB	2.0	±0.2	72.8	±6.2	72	±5	36	0.36
353355	24	RIM	Main Population	PB	3.0	±0.1	102.9	±3.6	108	±3		0.24
353355	25	RIM	Main Population	PB	1.9	±0.3	69.0	±7.6	76	±7		0.32
353355	26	RIM	Inherited	PB	10.0	±0.9	116.8	±8.9	267	±20	146	0.41
353355	27	RIM	Main Population	PB	7.3	±1.0	121.1	±9.9	254	±32	339	0.24
353355	28	RIM	Main Population	PB	2.5	±0.3	58.1	±5.9	93	±11	86	0.35
353355	29	RIM	Main Population	PB	2.1	±0.2	38.6	±1.4	77	±3	236	0.37
353355	30	RIM	Main Population	PB	2.4	±0.3	46.5	±3.4	79	±7		0.31
353355	31	RIM	Discordant	PB	3.6	±0.4	76.1	±1.1	125	±2	29	0.30
353355	32	RIM	Main Population	PB	2.3	±0.2	56.1	±1.3	97	±2		0.31
353355	33	RIM	Inherited	PB	4.0	±0.2	50.0	±1.4	108	±3		0.39
353355	34	RIM	Main Population	PB	11.2	±1.9	227.0	±38.0	408	±67	62	0.35
353355	35	RIM	Main Population	PB	2.0	±0.1	42.8	±1.5	67	±3	213	0.31
353355	36	CORE	Main Population	PB	1.6	±0.1	56.7	±3.6	57	±3	60	0.34
353355	36	RIM	Main Population	PB	4.6	±0.2	79.8	±2.5	158	±4		0.18
353355	37	RIM	Discordant	PB	2.1	±0.2	85.3	±3.5	88	±4	27	0.35
353355	38	RIM	Main Population	PB	1.7	±0.1	49.2	±1.6	63	±2	216	0.34

Table A1. 5 continued: Zircon geochemistry for Pb, Th, U and Ce and Eu anomalies. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	206 Pb		232 Th		238 U		Ce anomaly	Eu anomaly
353355	39	RIM	Main Population	PB	2.1	±0.1	46.6	±1.1	72	±1		0.29
353355	40	RIM	Main Population	PB	1.6	±0.1	38.2	±0.6	57	±1		0.35
353355	41	RIM	Main Population	PB	1.5	±0.1	51.1	±1.4	52	±1	103	0.32
353355	42	RIM	Discordant	PB	2.2	±0.4	49.3	±3.5	63	±3	17	0.31
353355	43	RIM	Discordant	PB	1.3	±0.1	29.0	±1.2	43	±2	195	0.31
353355	44	CORE	Main Population	PB	1.4	±0.1	44.1	±1.8	48	±1		0.36
353355	44	RIM	Main Population	PB	1.4	±0.1	34.5	±0.9	50	±1		0.39
353355	45	RIM	Main Population	PB	3.3	±0.1	57.6	±1.6	115	±3		0.23
353355	46	RIM	Main Population	PB	1.6	±0.1	42.9	±1.4	55	±2		0.34
353355	47	RIM	Main Population	PB	1.4	±0.1	35.3	±2.0	50	±2	188	0.33
353355	48	RIM	Main Population	PB	1.7	±0.1	44.8	±1.8	61	±1		0.29
353355	49	RIM	Main Population	PB	1.9	±0.2	47.1	±1.7	73	±4	145	0.30
353355	50	RIM	Main Population	PB	6.6	±0.3	135.9	±9.3	250	±7	173	0.21
353358	1	RIM	Main Population	PB	4.7	±1.0	149.0	±35.0	170	±35	120	0.35
353358	2	RIM	Main Population	PB	2.7	±0.1	101.6	±6.1	97	±3	50	0.32
353358	3	RIM	Main Population	PB	4.6	±0.6	86.0	±2.3	152	±17	31	0.28
353358	4	RIM	Inherited	PB	1.8	±0.2	54.5	±0.8	77	±1		0.27
353358	5	RIM	Main Population	PB	3.4	±1.1	111.0	±38.0	137	±45	181	0.31
353358	6	RIM	Main Population	PB	1.6	±0.1	38.9	±1.0	56	±2		0.33
353358	7	RIM	Inherited	PB	2.2	±0.2	62.5	±3.1	68	±3	51	0.41
353358	8	RIM	Main Population	PB	9.9	±0.4	277.0	±13.0	376	±13	224	0.34
353358	9	RIM	Main Population	PB	2.2	±0.5	91.0	±20.0	98	±21	39	0.38
353358	10	RIM	Main Population	PB	9.5	±0.3	224.4	±6.0	349	±7	137	0.29
353358	11	RIM	Discordant	PB	3.8	±0.2	140.0	±11.0	137	±8	190	0.31
353358	13	RIM	Main Population	PB	11.3	±0.3	302.0	±13.0	415	±14	185	0.38
353358	14	RIM	Main Population	PB	1.7	±0.2	40.1	±2.9	59	±5		0.37
353358	15	RIM	Inherited	PB	0.7	±0.2	18.5	±5.0	27	±7		0.31
353358	16	RIM	Inherited	PB	1.8	±0.1	40.2	±0.7	59	±1		0.32
353358	17	RIM	Main Population	PB	1.7	±0.1	39.1	±2.2	63	±5		0.29
353358	18	RIM	Discordant	PB	2.2	±0.1	47.3	±0.9	79	±1		0.30
353358	19	RIM	Main Population	PB	2.2	±0.1	57.0	±0.6	77	±1	180	0.30

Table A1. 5 continued: Zircon geochemistry for Pb, Th, U and Ce and Eu anomalies. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	206 Pb		232 Th		238 U		Ce anomaly	Eu anomaly
353358	20	RIM	Main Population	PB	2.5	±0.7	102.0	±33.0	105	±30	63	0.28
353358	21	RIM	Main Population	PB	4.9	±0.3	158.1	±9.7	184	±10	116	0.34
353358	22	RIM	Main Population	PB	3.9	±0.2	84.5	±1.9	145	±2		0.25
353358	23	RIM	Main Population	PB	9.2	±0.7	224.0	±19.0	331	±21	105	0.33
353358	24	RIM	Main Population	PB	1.8	±0.1	58.8	±3.7	64	±3	85	0.38
353358	25	RIM	Main Population	PB	1.5	±0.1	31.7	±1.1	53	±2		0.37
353358	26	RIM	Main Population	PB	11.0	±0.5	296.0	±21.0	414	±19	357	0.39
353358	27	RIM	Main Population	PB	1.5	±0.3	39.4	±6.7	59	±10		0.26
353358	28	RIM	Main Population	PB	1.8	±0.1	46.9	±2.2	65	±2		0.28
353358	29	RIM	Main Population	PB	8.6	±0.4	180.6	±9.7	300	±11	93	0.35
353358	30	RIM	Discordant	PB	5.1	±0.2	134.8	±5.6	181	±4	37	0.33
353358	31	RIM	Main Population	PB	2.7	±0.3	100.4	±6.6	116	±7	143	0.29
353358	32	RIM	Main Population	PB	2.2	±0.1	56.6	±2.4	84	±4	324	0.25
353358	33	RIM	Main Population	PB	10.9	±0.6	301.7	±8.1	427	±15	33	0.34
353358	34	RIM	Titanite/Apatite Inclusions	PB	10.7	±0.3	282.0	±18.0	392	±13	7	0.35
353358	35	RIM	Main Population	PB	9.5	±0.4	247.0	±22.0	365	±20	405	0.35
353358	36	CORE	Main Population	PB	1.2	±0.1	36.5	±2.4	44	±2		0.39
353358	36	MID	Main Population	PB	1.3	±0.1	34.7	±1.1	48	±1		0.38
353358	36	RIM	Inherited	PB	2.2	±0.1	37.1	±3.4	75	±6		0.31
353358	37	RIM	Main Population	PB	2.1	±0.1	49.0	±1.0	75	±2		0.29
353358	38	RIM	Main Population	PB	5.1	±1.2	163.0	±41.0	222	±55	624	0.38
353358	39	RIM	Inherited	PB	1.4	±0.1	33.0	±1.3	48	±2		0.34
353358	40	RIM	Inherited	PB	2.2	±0.1	47.1	±1.0	73	±2		0.25
353358	41	RIM	Main Population	PB	4.0	±0.2	149.4	±6.6	144	±3	55	0.23
353358	42	RIM	Main Population	PB	4.3	±0.2	86.8	±7.3	162	±11		0.34
353358	43	RIM	Main Population	PB	8.3	±0.4	253.4	±4.4	340	±4		0.26
353358	44	RIM	Main Population	PB	5.0	±0.9	134.0	±29.0	191	±35	117	0.33
353358	45	CORE	Main Population	PB	1.1	±0.1	32.0	±2.4	38	±2	167	0.36
353358	45	RIM	Discordant	PB	1.4	±0.1	32.1	±3.1	52	±5		0.33
353358	46	RIM	Lead Loss	PB	13.6	±1.4	260.0	±9.3	466	±17	96	0.60
353358	47	CORE	Lead Loss	PB	1.6	±0.1	20.7	±0.5	38	±1	11	0.34

Table A1. 5 continued: Zircon geochemistry for Pb, Th, U and Ce and Eu anomalies. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	206 Pb		232 Th		238 U		Ce anomaly	Eu anomaly
353358	47	RIM	Inherited	PB	1.8	±0.1	28.8	±1.4	60	±2		0.35
353358	48	RIM	Main Population	PB	1.8	±0.1	42.3	±3.1	63	±5		0.37
353358	49	RIM	Main Population	PB	14.5	±0.5	596.0	±14.0	621	±15	40	0.33
353362	1	RIM	Inherited	PS	3.1	±0.5	32.3	±1.0	94	±9	114	0.36
353362	2	RIM	Main Population	PS	5.3	±0.7	84.7	±9.0	227	±26	30	0.54
353362	3	RIM	Main Population	PS	5.0	±0.3	103.7	±5.9	182	±9		0.48
353362	4	RIM	Rejected	PS	2.8	±0.3	49.6	±1.9	104	±3	11	0.55
353362	5	RIM	Main Population	PS	16.6	±1.6	236.0	±16.0	566	±50	258	0.44
353362	6	RIM	Main Population	PS	4.0	±0.2	66.4	±4.6	146	±9		0.46
353362	6	CORE	Lead Loss	PS	3.5	±0.3	99.3	±3.9	136	±4	77	0.44
353362	7	RIM	Inherited	PS	7.4	±1.3	330.0	±120.0	271	±67	32	0.39
353362	8	RIM	Main Population	PS	2.4	±0.2	39.8	±6.1	95	±9	167	0.44
353362	9	RIM	Main Population	PS	13.0	±0.5	382.0	±25.0	498	±22		0.44
353362	10	RIM	Main Population	PS	6.0	±0.3	133.9	±8.1	249	±8	60	0.54
353362	11	RIM	Inherited	PS	3.5	±0.3	67.0	±6.8	120	±10		0.48
353362	12	CORE	Inherited	PS	5.8	±0.7	158.0	±27.0	202	±23	83	0.21
353362	12	RIM	Inherited	PS	3.8	±0.7	51.0	±17.0	95	±25		0.35
353362	13	RIM	Inherited	PS	3.0	±0.2	81.1	±4.5	110	±5	71	0.35
353362	14	RIM	Inherited	PS	5.5	±0.6	93.0	±14.0	194	±22		0.43
353362	15	RIM	Main Population	PS	1.8	±0.2	47.7	±3.2	69	±3		0.40
353362	16	RIM	Main Population	PS	3.5	±0.2	58.2	±4.0	136	±7	87	0.48
353362	17	RIM	Main Population	PS	4.6	±0.3	82.8	±2.3	201	±3		0.67
353362	18	RIM	Main Population	PS	4.2	±0.4	73.3	±3.8	190	±15	69	0.32
353362	19	RIM	Main Population	PS	4.4	±0.3	107.1	±4.3	167	±5	129	0.48
353362	20	CORE	Inherited	PS	3.1	±0.2	67.5	±3.4	105	±4	33	0.55
353362	20	RIM	Main Population	PS	2.8	±0.2	51.7	±6.1	95	±9	29	0.41
353362	21	RIM	Main Population	PS	3.8	±0.5	81.3	±8.6	169	±19	38	0.39
353362	22	CORE	Main Population	PS	3.3	±0.4	64.6	±2.9	124	±4	190	0.47
353362	22	RIM	Lead Loss	PS	4.7	±0.2	75.3	±4.3	203	±8	98	0.78
353362	23	CORE	Main Population	PS	4.7	±0.4	110.0	±16.0	179	±16	24	0.44
353362	23	RIM	Main Population	PS	8.0	±1.4	65.8	±5.3	301	±57	26	0.44

Table A1. 5 continued: Zircon geochemistry for Pb, Th, U and Ce and Eu anomalies. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	206 Pb		232 Th		238 U		Ce anomaly	Eu anomaly
353362	24	RIM	Main Population	PS	73.2	±2.8	971.0	±80.0	2790	±140	14	0.37
353362	25	RIM	Main Population	PS	5.6	±0.9	80.9	±9.2	205	±31	159	0.45
353362	26	RIM	Main Population	PS	7.3	±0.6	159.0	±8.8	292	±21	88	0.46
353362	27	RIM	Main Population	PS	3.8	±0.2	70.4	±3.5	130	±3		0.46
353362	28	RIM	Main Population	PS	12.5	±1.0	206.0	±20.0	490	±39	13	0.35
353362	29	RIM	Lead Loss	PS	16.2	±1.8	393.0	±60.0	702	±69	61	0.58
353362	30	RIM	Inherited	PS	3.9	±0.6	78.4	±8.3	152	±8	72	0.39
353362	31	RIM	Lead Loss	PS	10.9	±2.4	232.0	±39.0	433	±88	56	0.36
353362	32	RIM	Discordant	PS	1.1	±0.1	25.0	±0.6	39	±1		0.38
353362	33	RIM	Lead Loss	PS	2.5	±0.2	60.9	±2.8	96	±3	78	0.35
353362	34	RIM	Inherited	PS	3.9	±0.3	65.2	±6.0	133	±9	126	0.51
353362	34	CORE	Inherited	PS	16.3	±3.8	990.0	±300.0	560	±140	129	0.38
353362	35	CORE	Lead Loss	PS	0.8	±0.3	20.9	±7.3	35	±11	108	0.55
353362	35	RIM	Main Population	PS	12.3	±1.6	251.0	±45.0	409	±50		0.46
353362	36	RIM	Main Population	PS	3.6	±0.2	51.3	±0.7	121	±1	43	0.49
353362	37	RIM	Main Population	PS	5.1	±0.5	73.6	±7.9	178	±14	141	0.63
353362	38	RIM	Rejected	PS	4.3	±0.8	76.3	±2.9	200	±8	42	0.49
353362	39	RIM	Discordant	PS	5.3	±0.2	82.9	±2.3	188	±5		0.54
353362	40	CORE	Discordant	PS	3.9	±0.2	84.9	±5.4	132	±2	54	0.50
353362	40	RIM	Main Population	PS	6.1	±0.2	97.7	±2.0	214	±4	440	0.50
353362	41	RIM	Main Population	PS	1.5	±0.1	23.0	±0.9	53	±2		0.31
353362	41	CORE	Main Population	PS	4.1	±1.2	120.0	±36.0	167	±48		0.38
353362	42	RIM	Discordant	PS	2.5	±0.3	70.8	±2.9	105	±5	37	0.49
353362	43	RIM	Main Population	PS	2.2	±0.2	35.4	±1.9	86	±2		0.33
353362	44	RIM	Main Population	PS	1.7	±0.1	31.3	±0.9	66	±2	178	0.41
353362	44	CORE	Lead Loss	PS	6.3	±0.8	111.0	±17.0	223	±32	299	0.39
353362	46	RIM	Main Population	PS	2.4	±0.1	43.0	±1.8	89	±4		0.47
353362	48	RIM	Main Population	PS	1.5	±0.1	41.1	±2.9	51	±2		0.40
353362	49	RIM	Main Population	PS	4.6	±0.8	41.1	±3.7	158	±24	77	0.37
353363	1	CORE	Main Population	PS	1.2	±0.1	21.4	±1.4	44	±2	66	0.46
353363	1	RIM	Inherited	PS	1.6	±0.2	24.3	±0.9	46	±1	33	0.40

Table A1. 5 continued: Zircon geochemistry for Pb, Th, U and Ce and Eu anomalies. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	206 Pb		232 Th		238 U		Ce anomaly	Eu anomaly
353363	2	RIM	Inherited	PS	2.5	±0.2	66.3	±3.5	98	±5	22	0.36
353363	3	RIM	Main Population	PS	2.0	±0.2	26.3	±1.5	81	±4	28	0.43
353363	4	RIM	Main Population	PS	1.6	±0.2	44.8	±2.3	55	±3	65	0.38
353363	5	RIM	Main Population	PS	3.0	±0.4	41.9	±3.1	120	±9	23	0.40
353363	6	RIM	Discordant	PS	14.2	±0.8	392.0	±37.0	574	±37	139	0.47
353363	7	RIM	Inherited	PS	12.0	±0.3	228.3	±4.0	250	±6	17	0.18
353363	8	RIM	Main Population	PS	7.0	±0.3	118.0	±13.0	269	±13	56	0.48
353363	9	RIM	Main Population	PS	12.0	±0.7	790.0	±100.0	485	±33	85	0.51
353363	10	RIM	Main Population	PS	7.1	±0.4	167.5	±3.6	303	±7	65	0.45
353363	11	RIM	Main Population	PS	8.9	±0.7	207.0	±23.0	379	±28	61	0.37
353363	12	RIM	Discordant	PS	5.7	±0.6	107.1	±9.8	245	±12	52	0.37
353363	13	RIM	Main Population	PS	8.9	±0.7	206.0	±13.0	322	±25	98	0.39
353363	14	RIM	Inherited	PS	4.0	±1.1	101.0	±34.0	173	±49	107	0.38
353363	15	RIM	Main Population	PS	2.1	±0.3	66.5	±6.4	86	±4	84	0.33
353363	16	RIM	Discordant	PS	5.4	±0.3	106.1	±4.0	218	±5	174	0.45
353363	17	RIM	Titanite/Apatite Inclusions	PS	4.2	±0.4	80.1	±3.0	197	±14	20	0.45
353363	18	RIM	Discordant	PS	4.2	±0.4	86.0	±4.3	167	±9	82	0.56
353363	19	RIM	Main Population	PS	8.6	±0.5	184.0	±17.0	373	±22	83	0.35
353363	20	RIM	Main Population	PS	5.4	±0.6	97.0	±17.0	221	±24	140	0.37
353363	21	RIM	Main Population	PS	9.9	±0.4	200.4	±3.1	340	±4	115	0.46
353363	22	CORE	Inherited	PS	1.9	±0.2	34.5	±3.1	61	±5	87	0.41
353363	22	RIM	Main Population	PS	5.6	±0.3	113.7	±2.0	199	±3	339	0.42
353363	23	RIM	Main Population	PS	6.6	±0.5	130.0	±13.0	260	±19	26	0.40
353363	25	RIM	Inherited	PS	11.4	±0.5	336.0	±32.0	398	±23	543	0.34
353363	26	RIM	Rejected	PS	6.7	±0.5	134.0	±23.0	259	±26	2	0.39
353363	27	RIM	Inherited	PS	7.0	±0.6	113.0	±19.0	230	±24	90	0.43
353363	28	RIM	Main Population	PS	9.7	±0.5	216.0	±13.0	395	±21	292	0.39
353363	29	RIM	Discordant	PS	2.3	±0.1	36.1	±2.1	84	±5	45	0.51
353363	30	RIM	Inherited	PS	12.1	±0.6	352.0	±25.0	420	±22	90	0.37
353363	31	RIM	Main Population	PS	4.1	±0.3	120.0	±17.0	174	±12	46	0.62
353363	32	RIM	Discordant	PS	5.8	±0.7	149.0	±24.0	223	±27	28	0.42

Table A1. 5 continued: Zircon geochemistry for Pb, Th, U and Ce and Eu anomalies. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	206 Pb		232 Th		238 U		Ce anomaly	Eu anomaly
353363	33	RIM	Inherited	PS	155.0	±16.0	222.0	±23.0	1500	±140	23	0.16
353363	34	RIM	Main Population	PS	8.8	±0.4	172.0	±5.1	352	±8	99	0.38
353363	35	RIM	Main Population	PS	5.4	±0.3	124.0	±2.8	227	±5	58	0.50
353363	36	RIM	Main Population	PS	6.3	±0.6	100.0	±17.0	263	±27	79	0.49
353363	37	RIM	Main Population	PS	2.5	±0.4	49.0	±6.4	101	±12	80	0.38
353363	38	RIM	Discordant	PS	3.4	±0.2	58.5	±1.8	118	±3	108	0.36
353363	39	RIM	Main Population	PS	6.8	±0.3	125.1	±9.5	265	±12	121	0.45
353363	40	RIM	Titanite/Apatite Inclusions	PS	11.1	±2.2	163.0	±21.0	474	±74	4	0.28
353363	41	RIM	Main Population	PS	5.2	±0.6	119.0	±24.0	240	±26	126	0.30
353363	42	RIM	Main Population	PS	3.5	±0.2	64.0	±1.5	124	±4	82	0.44
353363	43	RIM	Inherited	PS	1.7	±0.1	25.1	±1.3	59	±3		0.48
353363	44	RIM	Inherited	PS	1.5	±0.1	34.3	±2.2	50	±3	57	0.41
353363	45	RIM	Inherited	PS	3.8	±0.7	67.1	±7.4	137	±18		0.30
353363	46	RIM	Rejected	PS	7.4	±0.9	214.0	±28.0	275	±24	24	0.51
353363	47	CORE	Main Population	PS	1.5	±0.1	45.3	±1.0	55	±1	75	0.39
353363	47	RIM	Main Population	PS	5.5	±0.3	117.4	±6.7	209	±6	120	0.43
353363	48	RIM	Inherited	PS	1.4	±0.1	31.8	±3.1	48	±3		0.43
353363	49	RIM	Main Population	PS	1.5	±0.1	41.5	±1.4	55	±2		0.44
353368	1	RIM	Main Population	PS	3.9	±0.2	64.4	±2.0	145	±4		0.52
353368	2	RIM	Main Population	PS	1.2	±0.1	30.6	±1.3	47	±1	98	0.40
353368	3	RIM	Main Population	PS	3.9	±0.2	116.5	±4.4	154	±3	71	0.37
353368	4	RIM	Main Population	PS	1.5	±0.1	30.1	±1.1	56	±2		0.44
353368	5	CORE	Main Population	PS	1.4	±0.1	24.8	±1.2	49	±1		0.41
353368	5	RIM	Main Population	PS	1.7	±0.1	28.8	±1.3	61	±2		0.34
353368	6	RIM	Main Population	PS	4.2	±0.8	104.0	±19.0	180	±35	365	0.47
353368	7	RIM	Inherited	PS	2.0	±0.2	72.0	±3.0	82	±3	105	0.64
353368	8	RIM	Main Population	PS	1.4	±0.2	47.6	±1.3	62	±1	56	0.33
353368	9	RIM	Inherited	PS	1.8	±0.1	36.9	±3.8	61	±4		0.37
353368	10	RIM	Main Population	PS	3.2	±0.2	59.9	±2.3	120	±3		0.45
353368	10	CORE	Inherited	PS	3.0	±0.3	57.8	±3.1	93	±1	153	0.31
353368	11	RIM	Main Population	PS	1.9	±0.1	46.2	±1.0	79	±1	117	0.40

Table A1. 5 continued: Zircon geochemistry for Pb, Th, U and Ce and Eu anomalies. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	206 Pb		232 Th		238 U		Ce anomaly	Eu anomaly
353368	12	RIM	Main Population	PS	3.1	±0.1	71.2	±8.8	112	±6	47	0.47
353368	13	RIM	Inherited	PS	2.4	±0.2	90.0	±12.0	91	±9	68	0.39
353368	14	RIM	Main Population	PS	1.3	±0.1	32.7	±1.1	49	±1	174	0.40
353368	15	RIM	Discordant	PS	1.5	±0.1	30.9	±1.1	59	±2	81	0.39
353368	16	RIM	Main Population	PS	1.4	±0.2	33.2	±1.0	59	±2	122	0.45
353368	17	RIM	Main Population	PS	1.3	±0.1	26.7	±1.1	45	±2		0.42
353368	18	RIM	Main Population	PS	2.3	±0.4	50.3	±5.0	88	±14	131	0.35
353368	19	RIM	Main Population	PS	1.6	±0.5	52.0	±15.0	72	±21	285	0.41
353368	20	RIM	Main Population	PS	1.6	±0.7	36.0	±17.0	76	±36	145	0.57
353368	22	RIM	Discordant	PS	5.0	±0.3	83.8	±7.1	186	±15	97	0.41
353368	23	RIM	Main Population	PS	2.1	±0.2	53.1	±5.0	84	±8		0.38
353368	24	RIM	Main Population	PS	1.5	±0.1	47.1	±3.5	57	±3	90	0.40
353368	25	RIM	Inherited	PS	2.0	±0.2	34.3	±4.1	74	±8	67	0.39
353368	26	RIM	Main Population	PS	1.1	±0.1	21.1	±0.5	45	±1		0.44
353368	27	RIM	Main Population	PS	3.6	±0.2	145.4	±8.1	136	±6	50	0.42
353368	28	RIM	Main Population	PS	1.5	±0.1	28.4	±0.9	56	±1		0.45
353368	29	RIM	Lead Loss	PS	4.2	±0.4	120.1	±6.6	172	±14	34	0.38
353368	30	RIM	Main Population	PS	0.8	±0.3	20.9	±7.3	36	±12	144	0.44
353368	31	RIM	Main Population	PS	0.9	±0.1	19.9	±0.5	34	±1		0.39
353368	32	RIM	Main Population	PS	16.6	±0.6	501.6	±8.9	622	±7	351	0.41
353368	33	RIM	Inherited	PS	2.5	±0.2	54.6	±6.0	86	±5	20	0.38
353368	34	RIM	Main Population	PS	1.6	±0.1	52.2	±7.0	63	±5	60	0.38
353368	35	RIM	Main Population	PS	4.8	±0.2	79.5	±3.3	183	±7	242	0.44
353368	36	RIM	Main Population	PS	2.6	±0.6	59.0	±13.0	106	±25	216	0.48
353368	37	RIM	Main Population	PS	2.0	±0.2	21.4	±0.4	78	±4		0.37
353368	38	RIM	Inherited	PS	6.3	±0.3	113.0	±14.0	215	±17		0.47
353368	39	RIM	Inherited	PS	5.3	±0.2	122.9	±9.6	190	±11	119	0.45
353368	40	RIM	Main Population	PS	2.5	±0.2	38.5	±0.7	95	±1		0.55
353368	41	RIM	Main Population	PS	2.5	±0.4	63.4	±6.6	89	±14		0.37
353368	42	RIM	Main Population	PS	2.1	±0.1	37.2	±0.5	77	±1		0.50
353368	43	RIM	Discordant	PS	2.5	±0.2	104.6	±8.1	102	±6	45	0.39

Table A1. 5 continued: Zircon geochemistry for Pb, Th, U and Ce and Eu anomalies. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	206 Pb		232 Th		238 U		Ce anomaly	Eu anomaly
353368	44	RIM	Main Population	PS	3.4	±0.3	128.4	±6.7	144	±5	49	0.40
353368	45	RIM	Main Population	PS	2.4	±0.2	39.5	±2.4	90	±5		0.43
353368	46	RIM	Main Population	PS	1.9	±0.2	65.7	±1.9	83	±2	50	0.38
353368	48	RIM	Main Population	PS	2.1	±0.2	52.7	±2.4	76	±8		0.40
353368	49	RIM	Main Population	PS	8.1	±1.7	84.0	±17.0	337	±72	48	0.46
353369	1	RIM	Main Population	PS	4.5	±0.5	147.2	±6.3	184	±5	58	0.48
353369	2	RIM	Main Population	PS	2.6	±0.2	41.8	±1.0	104	±2		0.52
353369	2	CORE	Main Population	PS	11.7	±1.0	350.0	±47.0	429	±31	245	0.40
353369	3	RIM	Main Population	PS	5.1	±0.2	158.1	±4.9	218	±4		0.50
353369	4	RIM	Main Population	PS	6.3	±1.5	201.0	±49.0	258	±62	120	0.44
353369	5	RIM	Inherited	PS	1.8	±0.1	37.6	±1.5	64	±2	135	0.37
353369	6	RIM	Main Population	PS	4.0	±0.2	74.4	±3.0	153	±5		0.46
353369	7	RIM	Main Population	PS	2.3	±0.1	92.5	±3.1	84	±2	67	0.32
353369	8	RIM	Main Population	PS	2.9	±0.1	57.9	±1.3	109	±2	156	0.45
353369	9	RIM	Inherited	PS	3.4	±0.2	52.7	±3.8	118	±7		0.45
353369	10	RIM	Main Population	PS	3.9	±0.2	63.0	±3.0	145	±8		0.50
353369	11	RIM	Lead Loss	PS	5.8	±1.0	133.0	±17.0	253	±44	26	0.30
353369	11	CORE	Main Population	PS	5.3	±0.4	112.3	±6.5	182	±8	27	0.58
353369	12	RIM	Main Population	PS	2.7	±0.1	45.5	±1.9	95	±3		0.49
353369	13	RIM	Inherited	PS	5.8	±0.5	122.0	±18.0	219	±21	132	0.41
353369	14	RIM	Inherited	PS	2.9	±0.2	55.3	±3.6	108	±7		0.42
353369	15	RIM	Main Population	PS	3.3	±0.2	58.5	±1.9	127	±3		0.55
353369	16	RIM	Main Population	PS	3.0	±0.2	61.1	±3.4	106	±3		0.40
353369	17	RIM	Main Population	PS	11.2	±2.2	261.0	±62.0	424	±86	254	0.25
353369	18	RIM	Main Population	PS	2.1	±0.1	36.6	±0.9	80	±2	96	0.52
353369	19	RIM	Lead Loss	PS	7.9	±0.3	111.0	±7.1	308	±8	167	0.53
353369	20	RIM	Main Population	PS	4.6	±0.2	96.2	±1.7	186	±3	83	0.53
353369	21	RIM	Titanite/Apatite Inclusions	PS	6.1	±0.2	99.5	±3.1	222	±4	1	0.40
353369	22	RIM	Main Population	PS	6.4	±0.3	167.8	±7.6	240	±3		0.49
353369	23	RIM	Main Population	PS	5.0	±0.2	88.6	±4.0	185	±6		0.43
353369	24	RIM	Main Population	PS	3.5	±0.2	73.9	±1.1	131	±1		0.46

Table A1. 5 continued: Zircon geochemistry for Pb, Th, U and Ce and Eu anomalies. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	206 Pb		232 Th		238 U		Ce anomaly	Eu anomaly
353369	25	RIM	Main Population	PS	3.8	±0.2	66.9	±2.0	144	±3		0.49
353369	26	RIM	Main Population	PS	2.4	±0.2	39.6	±0.5	92	±2		0.46
353369	27	RIM	Inherited	PS	3.3	±0.1	59.3	±2.3	108	±3		0.42
353369	28	RIM	Main Population	PS	2.9	±0.1	54.6	±1.9	108	±3		0.46
353369	29	RIM	Main Population	PS	2.2	±0.1	45.2	±2.0	82	±3		0.43
353369	30	RIM	Main Population	PS	4.3	±0.2	85.2	±4.8	173	±8	225	0.46
353369	31	RIM	Main Population	PS	5.2	±0.3	75.5	±1.2	211	±10	44	0.50
353369	32	RIM	Main Population	PS	25.9	±1.0	908.0	±37.0	944	±35	63	0.16
353369	33	RIM	Main Population	PS	2.0	±0.6	66.8	±7.0	91	±5	28	0.20
353369	34	RIM	Main Population	PS	3.6	±0.1	62.7	±2.7	130	±5		0.42
353369	35	RIM	Main Population	PS	2.4	±0.1	39.9	±2.0	89	±4		0.45
353369	36	RIM	Inherited	PS	4.4	±0.3	114.8	±8.5	175	±9	70	0.31
353369	37	RIM	Main Population	PS	3.4	±0.2	79.1	±4.1	134	±9	60	0.36
353369	38	RIM	Inherited	PS	2.8	±0.6	68.0	±15.0	110	±23	130	0.33
353369	39	RIM	Titanite/Apatite Inclusions	PS	14.9	±2.4	301.0	±53.0	526	±90	2	0.22
353369	40	RIM	Main Population	PS	3.1	±0.8	102.0	±27.0	130	±34	212	0.54
353369	41	RIM	Main Population	PS	4.0	±0.2	101.9	±8.2	158	±8	178	0.41
353369	42	RIM	Discordant	PS	0.8	±0.2	17.4	±5.4	32	±10	195	0.42
353369	43	RIM	Main Population	PS	1.3	±0.4	34.0	±10.0	51	±15	98	0.49
353369	44	RIM	Main Population	PS	3.2	±0.1	51.6	±1.4	121	±3		0.44
353369	45	RIM	Main Population	PS	4.7	±0.2	90.3	±1.4	178	±2		0.58
353369	46	RIM	Main Population	PS	3.9	±0.2	73.7	±0.6	147	±2	113	0.53
353369	47	RIM	Main Population	PS	1.8	±0.4	32.5	±6.1	74	±14	43	0.44
353369	48	RIM	Inherited	PS	3.7	±0.2	62.2	±1.8	132	±4		0.48
353369	49	RIM	Discordant	PS	3.2	±0.2	53.7	±2.2	125	±3	84	0.36
353369	50	RIM	Discordant	PS	1.3	±0.1	27.9	±0.8	50	±1		0.40
353369	51	RIM	Main Population	PS	16.8	±0.5	625.0	±14.0	625	±9	175	0.35
353381	1	RIM	Discordant	UR	8.1	±0.7	104.2	±6.8	201	±15		0.34
353381	2	RIM	Lead Loss	UR	43.5	±2.4	656.0	±35.0	1176	±65	233	0.24
353381	3	RIM	Lead Loss	UR	24.4	±0.9	461.0	±13.0	680	±15	80	0.46
353381	4	RIM	Main Population	UR	14.8	±0.6	344.0	±27.0	415	±19	112	0.45

Table A1. 5 continued: Zircon geochemistry for Pb, Th, U and Ce and Eu anomalies. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	206 Pb		232 Th		238 U		Ce anomaly	Eu anomaly
353381	5	RIM	Main Population	UR	23.1	±0.8	361.0	±11.0	689	±16		0.37
353381	6	RIM	Main Population	UR	18.4	±1.5	297.0	±33.0	540	±49	232	0.46
353381	7	RIM	Inherited	UR	11.7	±1.3	155.0	±18.0	278	±31		0.49
353381	8	RIM	Main Population	UR	24.1	±0.7	481.0	±22.0	617	±18	90	0.39
353381	9	RIM	Titanite/Apatite Inclusions	UR	45.4	±4.4	704.0	±90.0	1290	±170	2	0.28
353381	10	CORE	Main Population	UR	6.5	±0.3	137.3	±5.4	162	±3	67	0.58
353381	10	RIM	Inherited	UR	8.0	±2.9	136.0	±52.0	238	±90	1054	0.33
353381	11	RIM	Inherited	UR	8.0	±0.3	118.5	±1.7	165	±2	38	0.28
353381	12	RIM	Inherited	UR	5.0	±0.4	84.5	±6.7	123	±5	50	0.20
353381	13	RIM	Titanite/Apatite Inclusions	UR	42.0	±24.0	219.0	±43.0	348	±58		NA
353381	14	RIM	Main Population	UR	22.5	±1.8	501.0	±57.0	622	±57	108	0.35
353381	15	RIM	Main Population	UR	22.8	±0.6	443.0	±23.0	565	±10	458	0.39
353381	16	CORE	Inherited	UR	14.2	±0.6	303.0	±19.0	371	±15	109	0.53
353381	16	RIM	Main Population	UR	15.9	±3.7	268.0	±63.0	403	±94	407	0.34
353381	17	RIM	Inherited	UR	9.2	±0.4	257.0	±13.0	197	±6	42	0.73
353381	18	RIM	Inherited	UR	24.5	±0.9	358.0	±16.0	568	±23		0.32
353381	18	RIM	Main Population	UR	28.6	±0.9	543.0	±22.0	758	±13	351	0.32
353381	19	RIM	Lead Loss	UR	33.5	±1.0	573.0	±18.0	1029	±37	464	0.31
353381	20	RIM	Inherited	UR	18.1	±1.3	443.0	±57.0	440	±24	128	0.46
353381	21	RIM	Main Population	UR	23.8	±1.4	368.0	±33.0	591	±37	296	0.35
353381	23	RIM	Lead Loss	UR	28.2	±1.0	636.0	±22.0	750	±20	121	0.43
353381	24	RIM	Main Population	UR	39.4	±1.3	1198.0	±36.0	952	±20	351	0.61
353381	25	RIM	Lead Loss	UR	27.9	±1.0	540.0	±19.0	811	±25	30	0.34
353381	26	RIM	Lead Loss	UR	29.4	±1.0	484.6	±8.1	917	±17		0.23
353381	27	RIM	Main Population	UR	11.1	±0.9	217.0	±26.0	323	±24	138	0.40
353381	28	RIM	Main Population	UR	26.8	±1.4	515.0	±33.0	730	±35	312	0.30
353381	29	RIM	Main Population	UR	14.1	±1.0	307.0	±25.0	390	±18	56	0.37
353381	30	RIM	Lead Loss	UR	24.6	±1.1	423.0	±35.0	679	±28	286	0.34
353381	31	RIM	Discordant	UR	20.8	±0.9	318.0	±13.0	489	±24	95	0.34
353381	32	RIM	Lead Loss	UR	69.3	±3.6	585.0	±69.0	1963	±81	44	0.15
353381	33	RIM	Inherited	UR	12.2	±0.6	156.1	±8.7	330	±20		0.35

Table A1. 5 continued: Zircon geochemistry for Pb, Th, U and Ce and Eu anomalies. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	206 Pb		232 Th		238 U		Ce anomaly	Eu anomaly
353381	33	RIM	Main Population	UR	15.8	±1.0	272.6	±9.2	447	±19	235	0.36
353381	34	RIM	Rejected	UR	14.3	±2.8	264.0	±52.0	399	±71	87	0.60
353381	35	RIM	Main Population	UR	19.8	±1.1	347.0	±39.0	573	±36		0.32
353381	36	RIM	Main Population	UR	14.5	±0.6	602.0	±13.0	394	±5	53	0.81
353381	37	RIM	Discordant	UR	16.9	±2.0	392.0	±28.0	502	±32	56	0.40
353381	38	RIM	Main Population	UR	15.3	±0.6	212.0	±17.0	419	±28	318	0.50
353381	39	RIM	Inherited	UR	14.5	±0.8	225.0	±17.0	398	±25	189	0.60
353381	40	RIM	Lead Loss	UR	19.8	±0.5	281.0	±11.0	516	±15	289	0.37
353381	41	RIM	Main Population	UR	27.7	±1.6	680.0	±66.0	789	±58	84	0.41
353381	42	RIM	Rejected	UR	17.7	±0.8	396.0	±13.0	505	±17	1	0.37
353381	42	RIM	Main Population	UR	26.1	±0.8	377.3	±6.6	749	±15		0.30
353381	43	RIM	Rejected	UR	27.1	±4.8	244.0	±38.0	539	±56		0.19
353381	44	RIM	Main Population	UR	23.9	±0.5	557.6	±9.0	599	±7	171	0.68
353381	45	RIM	Discordant	UR	19.6	±1.1	365.0	±22.0	562	±22	123	0.53
353381	46	RIM	Inherited	UR	9.8	±3.1	150.0	±51.0	281	±92	59	0.36
353381	47	RIM	Main Population	UR	21.2	±1.0	366.0	±24.0	570	±30	59	0.30
353381	48	RIM	Inherited	UR	25.8	±2.2	369.0	±56.0	598	±68	390	0.30
353381	49	RIM	Lead Loss	UR	21.8	±0.7	371.0	±13.0	574	±11	73	0.37
353384	1	RIM	Inherited	PB	4.9	±0.2	129.2	±5.9	148	±6	23	0.26
353384	2	RIM	Titanite/Apatite Inclusions	PB	3.2	±0.3	79.9	±7.8	101	±7	9	0.27
353384	3	RIM	Inherited	PB	10.6	±2.1	207.0	±37.0	275	±49	97	0.41
353384	4	RIM	Main Population	PB	67.7	±9.0	5310.0	±890.0	2600	±320	87	0.09
353384	5	RIM	Main Population	PB	4.6	±0.3	105.9	±4.0	146	±7	40	0.26
353384	6	RIM	Inherited	PB	49.6	±2.9	256.0	±39.0	1614	±83	41	0.51
353384	7	RIM	Inherited	PB	6.3	±0.4	135.9	±3.4	197	±5	23	0.38
353384	8	RIM	Discordant	PB	21.6	±5.8	702.0	±88.0	840	±200	100	0.14
353384	9	RIM	Inherited	PB	8.0	±0.8	160.9	±6.2	223	±16	192	0.17
353384	10	RIM	Lead Loss	PB	4.6	±0.4	114.0	±10.0	165	±10	5	0.16
353384	11	RIM	Inherited	PB	3.7	±0.2	62.4	±2.4	103	±3	74	0.37
353384	12	RIM	Main Population	PB	6.9	±0.6	218.0	±13.0	268	±16	36	0.23
353384	13	RIM	Discordant	PB	4.7	±0.2	122.7	±2.2	141	±3	25	0.25

Table A1. 5 continued: Zircon geochemistry for Pb, Th, U and Ce and Eu anomalies. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	206 Pb		232 Th		238 U		Ce anomaly	Eu anomaly
353384	13	CORE	Main Population	PB	4.1	±0.2	114.0	±3.0	130	±3	28	0.28
353384	14	RIM	Discordant	PB	3.7	±0.2	82.0	±3.5	124	±5	83	0.24
353384	15	RIM	Main Population	PB	3.8	±0.4	115.5	±3.3	139	±5	38	0.24
353384	16	RIM	Main Population	PB	4.6	±0.2	85.7	±3.3	140	±5	57	0.23
353384	17	RIM	Lead Loss	PB	3.6	±0.2	97.6	±9.5	119	±8	39	0.28
353384	18	RIM	Inherited	PB	4.1	±0.5	97.3	±6.2	127	±7	22	0.39
353384	19	RIM	Discordant	PB	2.9	±0.3	67.9	±6.9	89	±7	37	0.24
353384	20	RIM	Inherited	PB	6.7	±0.8	163.0	±31.0	175	±23	45	0.42
353385	1	RIM	Inherited	UR	4.9	±0.3	70.9	±5.3	127	±8	96	0.33
353385	2	RIM	Main Population	UR	15.5	±0.5	995.0	±15.0	521	±6	187	0.66
353385	3	RIM	Discordant	UR	0.8	±0.2	15.1	±3.7	26	±6		0.44
353385	4	RIM	Inherited	UR	4.4	±0.3	41.3	±2.7	91	±3	40	0.39
353385	5	RIM	Inherited	UR	4.1	±0.6	131.0	±24.0	111	±15	40	0.40
353385	6	RIM	Inherited	UR	9.0	±0.4	155.0	±16.0	234	±13	71	0.43
353385	7	RIM	Inherited	UR	2.6	±0.3	66.9	±6.2	73	±5	17	0.42
353385	8	RIM	Discordant	UR	13.2	±0.9	1350.0	±100.0	488	±32	47	0.59
353385	9	RIM	Inherited	UR	10.4	±0.6	463.0	±53.0	305	±24	51	0.67
353385	10	RIM	Main Population	UR	11.3	±0.3	465.0	±17.0	342	±8	46	0.52
353385	11	RIM	Inherited	UR	2.8	±0.1	37.7	±1.1	71	±2		0.44
353385	12	RIM	Rejected	UR	3.6	±0.2	95.3	±9.3	92	±6	2	0.40
353385	12	RIM	Inherited	UR	2.7	±0.3	39.1	±4.7	69	±8	214	0.46
353385	13	RIM	Inherited	UR	5.3	±0.4	80.1	±4.8	134	±5	102	0.39
353385	14	RIM	Inherited	UR	3.2	±0.4	88.0	±17.0	102	±11	35	0.37
353385	15	RIM	Lead Loss	UR	9.0	±2.2	600.0	±150.0	319	±80	71	0.71
353385	16	RIM	Inherited	UR	4.5	±0.3	76.0	±11.0	112	±8	61	0.49
353385	17	RIM	Inherited	UR	0.9	±0.3	17.7	±5.1	26	±7	126	0.45
353385	18	RIM	Inherited	UR	1.0	±0.3	12.5	±3.4	26	±7	243	0.41
353385	19	RIM	Inherited	UR	4.5	±0.2	137.7	±6.2	130	±4	35	0.42
353385	20	RIM	Main Population	UR	5.6	±0.3	139.2	±5.7	179	±8	258	0.59
353385	21	RIM	Inherited	UR	2.9	±0.2	43.3	±1.4	74	±2	216	0.38
353385	22	RIM	Main Population	UR	21.3	±0.6	1284.0	±56.0	628	±24	94	0.60

Table A1. 5 continued: Zircon geochemistry for Pb, Th, U and Ce and Eu anomalies. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	206 Pb		232 Th		238 U		Ce anomaly	Eu anomaly
353385	23	RIM	Inherited	UR	5.1	±0.6	70.6	±3.4	112	±6	37	0.41
353385	24	RIM	Main Population	UR	10.4	±0.5	289.0	±27.0	290	±16	253	0.44
353385	25	RIM	Inherited	UR	5.7	±0.6	150.0	±12.0	160	±7	18	0.54
353385	26	RIM	Inherited	UR	0.8	±0.2	13.0	±3.5	25	±7	186	0.46
353385	27	CORE	Inherited	UR	5.5	±0.8	116.0	±14.0	144	±21	49	0.31
353385	27	RIM	Inherited	UR	4.4	±0.3	77.3	±1.6	136	±1	157	0.27
353385	28	RIM	Inherited	UR	3.4	±0.2	74.0	±5.9	92	±4	61	0.41
353385	29	RIM	Main Population	UR	8.3	±0.4	194.8	±8.4	263	±11	72	0.40
353385	30	RIM	Main Population	UR	8.6	±0.3	158.0	±11.0	256	±9		0.40
353385	30	CORE	Inherited	UR	5.8	±2.1	350.0	±140.0	190	±70	57	0.49
353385	31	CORE	Inherited	UR	3.0	±0.2	64.1	±3.0	83	±3	61	0.43
353385	31	RIM	Inherited	UR	3.0	±0.2	78.9	±6.0	92	±4	56	0.41
353385	32	RIM	Rejected	UR	9.7	±0.4	230.9	±9.9	258	±8	2	0.36
353385	33	RIM	Inherited	UR	6.6	±1.1	106.0	±13.0	187	±33	149	0.45
353385	33	CORE	Lead Loss	UR	9.7	±1.4	117.0	±13.0	298	±47	43	0.43
353385	34	RIM	Main Population	UR	7.4	±0.6	348.0	±39.0	255	±20	44	0.65
353388	1	RIM	Main Population	PB	3.8	±0.8	101.0	±17.0	128	±24	131	0.26
353388	2	RIM	Main Population	PB	1.5	±0.1	42.7	±1.7	53	±2	285	0.25
353388	3	RIM	Main Population	PB	1.4	±0.1	42.9	±3.8	49	±2	119	0.27
353388	4	RIM	Main Population	PB	1.9	±0.1	60.6	±3.4	68	±2	58	0.36
353388	5	RIM	Main Population	PB	1.5	±0.1	48.5	±3.7	55	±2	51	0.33
353388	6	RIM	Inherited	PB	6.6	±0.7	142.0	±29.0	153	±19	76	0.24
353388	7	RIM	Discordant	PB	1.5	±0.1	32.5	±0.7	47	±1	93	0.33
353388	8	RIM	Main Population	PB	1.9	±0.1	52.2	±5.0	71	±3		0.30
353388	9	RIM	Discordant	PB	1.7	±0.1	35.8	±1.2	56	±3	212	0.30
353388	10	RIM	Discordant	PB	0.9	±0.1	25.8	±3.3	36	±3		0.29
353388	11	RIM	Main Population	PB	2.2	±0.2	73.5	±8.9	75	±7	73	0.31
353388	12	RIM	Main Population	PB	1.3	±0.1	84.0	±17.0	50	±2	17	0.33
353388	13	RIM	Discordant	PB	1.2	±0.1	37.7	±2.8	40	±2		0.39
353388	14	RIM	Main Population	PB	0.8	±0.1	20.4	±1.7	31	±2	14	0.39
353388	15	RIM	Main Population	PB	3.2	±0.3	105.3	±3.4	118	±7	54	0.29

Table A1. 5 continued: Zircon geochemistry for Pb, Th, U and Ce and Eu anomalies. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	206 Pb		232 Th		238 U		Ce anomaly	Eu anomaly
353388	16	RIM	Main Population	PB	2.4	±0.2	136.0	±25.0	93	±9	19	0.33
353388	17	RIM	Inherited	PB	8.1	±0.3	154.0	±5.9	179	±4	29	0.18
353388	19	RIM	Main Population	PB	1.3	±0.1	32.6	±2.1	41	±2		0.36
353388	20	RIM	Main Population	PB	1.3	±0.1	29.5	±0.6	43	±1		0.34
353388	21	RIM	Main Population	PB	1.5	±0.1	53.1	±1.0	56	±1	85	0.35
353388	22	RIM	Main Population	PB	1.2	±0.1	37.5	±1.8	46	±2	148	0.34
353388	23	RIM	Main Population	PB	1.7	±0.1	65.2	±2.4	57	±2	31	0.35
353388	24	RIM	Main Population	PB	2.5	±0.2	77.9	±4.4	86	±4	34	0.32
353388	25	RIM	Main Population	PB	1.4	±0.1	31.6	±2.3	46	±1	94	0.30
353388	26	RIM	Discordant	PB	2.2	±0.1	68.9	±4.0	73	±4	44	0.33
353388	27	RIM	Main Population	PB	2.2	±0.3	45.2	±4.1	87	±10	89	0.32
353388	28	RIM	Discordant	PB	2.1	±0.1	86.2	±5.2	74	±3	63	0.31
353388	29	RIM	Lead Loss	PB	7.5	±1.4	174.0	±17.0	290	±50	27	0.18
353388	30	RIM	Discordant	PB	3.2	±0.6	88.1	±9.0	101	±18	33	0.36
353388	31	RIM	Main Population	PB	1.8	±0.1	45.7	±4.7	62	±4	97	0.28
353388	32	RIM	Discordant	PB	1.0	±0.3	34.0	±11.0	37	±9	43	0.31
353388	33	RIM	Main Population	PB	3.6	±0.2	66.7	±1.0	129	±2		0.24
353388	34	RIM	Main Population	PB	5.0	±0.3	234.0	±13.0	189	±8	35	0.30
353388	35	RIM	Main Population	PB	1.5	±0.2	47.1	±3.0	53	±3	72	0.31
353388	36	RIM	Main Population	PB	2.9	±0.4	65.3	±7.0	109	±12	56	0.30
353388	37	RIM	Lead Loss	PB	0.9	±0.4	156.0	±10.0	40	±15	9	0.31
353388	38	RIM	Main Population	PB	1.5	±0.1	34.2	±0.8	53	±1		0.33
353388	39	RIM	Main Population	PB	1.3	±0.1	31.8	±1.2	45	±1		0.33
353388	40	RIM	Main Population	PB	3.1	±0.3	73.5	±4.2	118	±5	112	0.20
353388	41	RIM	Titanite/Apatite Inclusions	PB	2.2	±0.2	131.0	±15.0	72	±2	1	0.24
353388	42	RIM	Rejected	PB	1.9	±0.2	147.0	±42.0	69	±5	7	0.34
353388	43	RIM	Main Population	PB	1.5	±0.1	35.7	±0.9	56	±1		0.30
353388	44	RIM	Lead Loss	PB	2.6	±0.5	39.7	±5.9	85	±17	90	0.27
353388	45	RIM	Main Population	PB	2.9	±0.2	83.2	±1.7	119	±5	90	0.24
353388	46	RIM	Main Population	PB	1.8	±0.1	39.0	±1.2	68	±2	183	0.30
353388	47	RIM	Titanite/Apatite Inclusions	PB	4.1	±0.6	1040.0	±260.0	131	±27	5	0.33

Table A1. 5 continued: Zircon geochemistry for Pb, Th, U and Ce and Eu anomalies. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	206 Pb		232 Th		238 U		Ce anomaly	Eu anomaly
353388	48	RIM	Main Population	PB	1.1	±0.1	27.9	±1.6	43	±3	92	0.32
353388	49	RIM	Main Population	PB	2.2	±0.1	78.6	±1.7	78	±2	100	0.34
353388	50	RIM	Inherited	PB	2.6	±0.3	77.6	±8.3	76	±7	39	0.31
353390	1	RIM	Titanite/Apatite Inclusions	PB	2.2	±0.1	46.9	±1.0	71	±2	1	0.24
353390	2	CORE	Inherited	PB	2.1	±0.1	40.9	±1.3	52	±1	70	0.36
353390	2	RIM	Inherited	PB	9.2	±0.4	64.3	±1.2	292	±24		0.36
353390	3	RIM	Discordant	PB	8.8	±1.4	315.0	±64.0	333	±44	122	0.34
353390	4	RIM	Main Population	PB	11.2	±1.1	329.0	±20.0	433	±25	78	0.31
353390	5	RIM	Main Population	PB	3.4	±0.4	97.7	±6.0	115	±10	59	0.36
353390	6	RIM	Lead Loss	PB	4.9	±1.4	144.0	±41.0	222	±64	112	0.40
353390	7	RIM	Lead Loss	PB	5.9	±0.2	159.5	±8.7	230	±7	137	0.38
353390	8	RIM	Main Population	PB	11.4	±0.7	316.0	±19.0	438	±20	88	0.34
353390	9	RIM	Titanite/Apatite Inclusions	PB	9.1	±0.3	283.0	±16.0	345	±14	4	0.33
353390	10	RIM	Main Population	PB	2.0	±0.1	36.8	±1.4	76	±4	174	0.31
353390	11	RIM	Discordant	PB	2.1	±0.1	59.3	±3.4	75	±3		0.30
353390	12	RIM	Main Population	PB	1.4	±0.1	33.0	±1.1	47	±1		0.46
353390	13	CORE	Discordant	PB	2.6	±0.3	61.5	±5.9	91	±11	114	0.29
353390	13	RIM	Main Population	PB	10.0	±0.3	242.9	±8.8	362	±7	152	0.35
353390	14	RIM	Lead Loss	PB	2.4	±0.4	69.0	±15.0	101	±17	130	0.32
353390	15	RIM	Main Population	PB	2.3	±0.1	41.7	±0.8	82	±1		0.27
353390	16	RIM	Main Population	PB	1.7	±0.1	40.4	±1.2	57	±1	113	0.22
353390	17	RIM	Discordant	PB	9.2	±0.7	222.0	±21.0	399	±29	118	0.42
353390	18	RIM	Lead Loss	PB	10.5	±0.5	353.0	±31.0	441	±23	375	0.39
353390	19	RIM	Main Population	PB	1.6	±0.1	35.1	±1.1	58	±3		0.34
353390	20	RIM	Main Population	PB	8.2	±0.6	221.0	±14.0	321	±21	76	0.36
353390	21	RIM	Main Population	PB	1.2	±0.1	31.0	±0.8	43	±1		0.33
353390	22	RIM	Main Population	PB	2.4	±0.2	47.4	±2.0	82	±4		0.34
353390	23	RIM	Main Population	PB	9.5	±0.5	167.7	±9.5	415	±18	69	0.37
353390	24	RIM	Lead Loss	PB	1.2	±0.2	35.8	±4.0	53	±6	8	0.41
353390	25	RIM	Main Population	PB	3.7	±0.3	91.2	±7.5	143	±10	55	0.35
353390	26	RIM	Inherited	PB	1.5	±0.1	34.6	±1.7	53	±2		0.31

Table A1. 5 continued: Zircon geochemistry for Pb, Th, U and Ce and Eu anomalies. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	206 Pb		232 Th		238 U		Ce anomaly	Eu anomaly
353390	27	RIM	Lead Loss	PB	3.9	±0.5	89.0	±11.0	154	±16	38	0.37
353390	28	RIM	Main Population	PB	6.6	±1.2	196.0	±37.0	265	±47	372	0.36
353390	29	RIM	Discordant	PB	8.3	±0.2	148.6	±3.3	273	±3	280	0.33
353390	30	RIM	Main Population	PB	7.1	±0.3	152.9	±2.2	247	±4		0.30
353390	31	RIM	Main Population	PB	2.4	±0.2	72.4	±5.0	85	±4	43	0.35
353390	32	RIM	Main Population	PB	5.0	±0.4	96.9	±1.2	187	±5	273	0.23
353390	33	CORE	Main Population	PB	2.8	±0.5	101.0	±19.0	109	±20	102	0.33
353390	33	MID	Main Population	PB	2.3	±0.5	69.0	±14.0	88	±18	108	0.34
353390	33	RIM	Main Population	PB	12.3	±0.4	398.0	±10.0	490	±6	109	0.34
353390	34	RIM	Main Population	PB	6.0	±0.7	195.0	±23.0	223	±25	194	0.29
353390	35	RIM	Main Population	PB	5.2	±0.4	131.0	±12.0	193	±12	101	0.35
353390	36	RIM	Discordant	PB	7.6	±0.3	157.4	±3.1	277	±4	489	0.36
353390	37	RIM	Main Population	PB	12.6	±1.2	485.0	±82.0	488	±32	174	0.22
353390	38	RIM	Lead Loss	PB	5.9	±0.8	172.0	±20.0	210	±21	165	0.32
353390	39	RIM	Main Population	PB	2.9	±0.7	107.0	±26.0	124	±29	150	0.33
353390	40	CORE	Inherited	PB	1.6	±0.1	49.1	±2.9	53	±3	94	0.39
353390	40	RIM	Main Population	PB	2.4	±0.1	53.9	±2.4	85	±3		0.31
353390	41	RIM	Lead Loss	PB	0.6	±0.1	14.9	±3.6	23	±5	76	0.32
353390	42	RIM	Discordant	PB	12.5	±2.2	165.0	±11.0	503	±82	59	0.46
353390	43	RIM	Main Population	PB	3.9	±0.6	106.0	±14.0	144	±21	89	0.33
353390	44	RIM	Inherited	PB	4.9	±0.3	101.0	±9.3	151	±11	265	0.38
353390	44	CORE	Inherited	PB	3.5	±0.2	69.1	±2.0	88	±2	157	0.43
353390	45	RIM	Inherited	PB	7.1	±0.6	191.0	±25.0	249	±26		0.34
353390	46	RIM	Main Population	PB	7.5	±0.4	182.3	±2.4	291	±4		0.35
353390	47	RIM	Main Population	PB	2.5	±0.1	44.7	±4.8	89	±5		0.35
353390	48	RIM	Discordant	PB	4.6	±0.2	114.7	±2.2	158	±3		0.38
353390	48	CORE	Main Population	PB	1.8	±0.1	34.4	±0.4	62	±0		0.33
353393	1	RIM	Main Population	TYC	7.8	±0.3	217.0	±11.0	348	±10	69	0.53
353393	2	RIM	Main Population	TYC	3.9	±0.4	75.7	±2.4	189	±9	28	0.51
353393	3	RIM	Discordant	TYC	6.0	±0.6	95.4	±6.4	267	±17	38	0.65
353393	4	RIM	Discordant	TYC	6.0	±0.3	115.5	±8.5	243	±13	239	0.59

Table A1. 5 continued: Zircon geochemistry for Pb, Th, U and Ce and Eu anomalies. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	206 Pb		232 Th		238 U		Ce anomaly	Eu anomaly
353393	5	RIM	Main Population	TYC	8.1	±0.3	244.9	±5.0	341	±4	180	0.57
353393	6	CORE	Inherited	TYC	4.0	±0.3	96.2	±8.8	146	±11	87	0.58
353393	6	RIM	Main Population	TYC	7.1	±0.3	134.0	±4.5	283	±6	378	0.57
353393	7	RIM	Discordant	TYC	5.4	±0.2	111.7	±6.0	225	±10	49	0.57
353393	8	CORE	Main Population	TYC	3.7	±0.3	89.0	±6.4	152	±9	205	0.66
353393	8	RIM	Discordant	TYC	6.5	±1.1	118.0	±19.0	248	±38	67	0.73
353393	9	RIM	Lead Loss	TYC	6.2	±0.3	121.3	±3.5	302	±7	72	0.51
353393	10	RIM	Main Population	TYC	2.7	±0.7	67.0	±16.0	110	±27	141	0.59
353393	11	RIM	Inherited	TYC	4.0	±0.2	35.0	±0.9	104	±2		0.24
353393	12	RIM	Discordant	TYC	7.4	±0.3	144.6	±5.1	320	±9	159	0.60
353393	13	RIM	Main Population	TYC	5.5	±0.3	101.1	±4.8	246	±10	223	0.55
353393	14	RIM	Main Population	TYC	15.5	±1.4	296.0	±23.0	748	±68	47	0.77
353393	15	RIM	Inherited	TYC	4.7	±0.4	84.0	±10.0	197	±15	167	0.63
353393	16	RIM	Main Population	TYC	7.2	±0.5	143.0	±15.0	315	±23	165	0.63
353393	17	RIM	Lead Loss	TYC	0.5	±0.1	6.9	±0.2	20	±0	107	0.76
353393	17	CORE	Lead Loss	TYC	0.7	±0.1	14.8	±0.6	27	±1	53	0.76
353393	18	RIM	Inherited	TYC	5.4	±0.8	83.4	±6.9	173	±16	47	0.57
353393	19	RIM	Main Population	TYC	3.8	±0.4	52.2	±4.0	175	±9	173	0.81
353393	20	RIM	Main Population	TYC	3.8	±0.2	48.6	±1.6	149	±4		0.61
353393	21	RIM	Main Population	TYC	6.0	±0.2	117.6	±3.5	243	±4		0.55
353393	22	RIM	Discordant	TYC	4.7	±0.3	94.4	±3.5	210	±4	89	0.62
353393	23	RIM	Main Population	TYC	7.8	±0.5	209.0	±24.0	360	±29	391	0.62
353393	24	RIM	Main Population	TYC	9.1	±0.3	179.1	±4.5	376	±9	567	0.64
353393	25	RIM	Inherited	TYC	8.2	±1.1	93.0	±16.0	254	±40	13	0.81
353393	26	RIM	Main Population	TYC	1.8	±0.2	37.0	±1.0	80	±2		0.63
353393	27	RIM	Main Population	TYC	2.0	±0.1	45.9	±1.8	78	±2	66	0.69
353393	28	RIM	Main Population	TYC	11.8	±1.3	253.3	±8.9	526	±25	107	0.69
353393	29	RIM	Main Population	TYC	5.0	±0.6	115.4	±9.1	260	±15	45	0.68
353393	30	RIM	Inherited	TYC	5.6	±0.3	25.3	±1.2	45	±2		0.41
353393	31	RIM	Main Population	TYC	6.6	±0.3	145.8	±5.8	274	±4	150	0.71
353393	31	CORE	Discordant	TYC	2.4	±0.1	71.9	±4.3	93	±3	85	0.55

Table A1. 5 continued: Zircon geochemistry for Pb, Th, U and Ce and Eu anomalies. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	206 Pb		232 Th		238 U		Ce anomaly	Eu anomaly
353393	32	RIM	Inherited	TYC	2.8	±0.2	50.1	±4.6	107	±8	98	0.75
353393	33	CORE	Main Population	TYC	4.1	±0.2	52.3	±3.6	170	±8	145	0.60
353393	33	RIM	Main Population	TYC	6.7	±0.3	101.6	±3.8	286	±10	84	0.58
353393	34	RIM	Discordant	TYC	6.1	±0.5	111.5	±9.2	281	±22	89	0.63
353393	35	RIM	Inherited	TYC	4.5	±0.8	78.0	±17.0	212	±36		0.49
353393	36	RIM	Main Population	TYC	4.4	±0.2	65.3	±2.2	179	±5		0.65
353393	37	RIM	Main Population	TYC	11.0	±0.6	212.5	±6.8	490	±18	139	0.58
353393	38	RIM	Inherited	TYC	6.3	±1.2	65.8	±2.3	284	±54	68	0.69
353393	39	RIM	Main Population	TYC	4.9	±0.3	109.1	±7.6	229	±12	125	0.67
353393	40	RIM	Main Population	TYC	5.9	±0.2	107.6	±8.2	245	±8	448	0.55
353393	41	CORE	Main Population	TYC	3.8	±0.2	71.6	±7.2	153	±7	90	0.64
353393	41	RIM	Main Population	TYC	5.7	±0.3	83.2	±5.6	225	±10	206	0.54
353393	42	RIM	Main Population	TYC	5.6	±0.2	87.8	±5.5	224	±10		0.83
353393	42	CORE	Inherited	TYC	8.8	±0.6	119.9	±3.3	263	±7		0.74
353393	43	RIM	Inherited	TYC	3.6	±0.3	61.6	±8.8	153	±10		0.60
353393	44	RIM	Inherited	TYC	7.1	±0.3	132.0	±14.0	270	±13		0.53
353393	45	RIM	Main Population	TYC	7.8	±1.0	140.4	±6.7	345	±34	150	0.54
353393	46	RIM	Inherited	TYC	10.0	±0.6	249.0	±23.0	361	±22	115	0.47
353393	46	CORE	Inherited	TYC	8.0	±0.4	231.0	±28.0	343	±24	128	0.57
353393	47	RIM	Inherited	TYC	4.7	±0.3	58.3	±4.2	176	±7	567	0.69
353393	47	CORE	Lead Loss	TYC	15.0	±0.9	720.0	±13.0	625	±9	75	0.61
353393	48	CORE	Inherited	TYC	3.4	±0.2	45.6	±2.4	127	±7	56	0.67
353393	48	RIM	Main Population	TYC	7.2	±0.3	140.3	±3.3	284	±3	648	0.61
353393	48	CORE	Main Population	TYC	4.1	±0.4	62.8	±6.6	174	±11	314	0.69
353393	49	RIM	Discordant	TYC	4.2	±0.4	70.1	±1.7	206	±3		0.90
353393	49	CORE	Discordant	TYC	4.9	±0.3	190.7	±9.0	185	±4	211	0.71
353393	50	RIM	Lead Loss	TYC	5.6	±0.5	117.9	±8.7	244	±10	187	0.52
353393	50	CORE	Lead Loss	TYC	6.8	±0.9	198.0	±25.0	315	±24	5	0.76
353393	51	RIM	Inherited	TYC	5.3	±0.5	112.0	±10.0	238	±10		0.62
353393	51	CORE	Main Population	TYC	3.3	±0.2	89.2	±3.5	123	±3	169	0.56
353393	51	MID	Inherited	TYC	7.4	±0.3	268.0	±10.0	272	±11		0.50

Table A1. 5 continued: Zircon geochemistry for Pb, Th, U and Ce and Eu anomalies. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles. Uncertainties are at 2σ level.

Sample	Grain	Sector	Observation	Area	206 Pb		232 Th		238 U		Ce anomaly	Eu anomaly
353393	52	MID	Main Population	TYC	4.9	±0.2	101.9	±2.8	203	±6		0.65
353393	52	CORE	Inherited	TYC	2.0	±0.1	52.5	±2.7	78	±4	73	0.60
353393	52	RIM	Discordant	TYC	5.9	±0.2	117.3	±5.4	245	±9	350	0.53
353393	53	RIM	Inherited	TYC	15.6	±0.5	94.6	±3.0	147	±2	64	0.51
353393	54	RIM	Discordant	TYC	4.0	±0.5	80.0	±7.4	178	±14	42	0.56

Table A1. 6: Zircon calculated variables Ce^{4+}/Ce^{3+} ratios, Ti in Zr temperatures, and oxygen fugacity. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles.

Sample	Grain	Sector	Observation	Area	Ce^{4+}/Ce^{3+} zircon	Ce^{4+}/Ce^{3+} melt	Ti-in-Zr Temperature (°C)	log $fO2$ (4 wt. % H_2O)	log ΔFQM (4 wt. % H_2O)	log $fO2$ (6 wt. % H_2O)	log ΔFQM (6 wt. % H_2O)	log $fO2$ (9 wt. % H_2O)	log ΔFQM (9 wt. % H_2O)
353353	1	RIM	Lead Loss	PB	36	0.00089	779	-15.77	-0.56	-14.96	0.25	-13.90	1.30
353353	2	RIM	Lead Loss	PB	7	0.00083	774	-16.02	-0.69	-15.20	0.13	-14.15	1.18
353353	3	RIM	Lead Loss	PB	22	0.00122	650	-18.27	0.26	-17.45	1.07	-16.40	2.12
353353	4	RIM	Lead Loss	PB	33	0.00088	756	-16.29	-0.55	-15.48	0.26	-14.42	1.31
353353	5	RIM	Lead Loss	PB	7	0.00096	741	-16.47	-0.37	-15.66	0.44	-14.61	1.50
353353	6	RIM	Main Population	PB	26	0.00087	757	-16.28	-0.56	-15.47	0.26	-14.41	1.31
353353	7	RIM	Main Population	PB	91	0.00112	719	-16.70	-0.04	-15.88	0.77	-14.83	1.82
353353	8	RIM	Main Population	PB	3	0.00063	810	-15.77	-1.24	-14.96	-0.42	-13.91	0.63
353353	9	RIM	Main Population	PB	20	0.00099	793	-15.31	-0.40	-14.49	0.41	-13.44	1.47
353353	10	RIM	Discordant	PB	157	0.00162	695	-16.62	0.64	-15.81	1.46	-14.75	2.51
353353	11	RIM	Main Population	PB	8	0.00077	812	-15.37	-0.88	-14.55	-0.07	-13.50	0.99
353353	12	RIM	Main Population	PB	13	0.00088	767	-16.07	-0.57	-15.25	0.24	-14.20	1.29
353353	13	RIM	Main Population	PB	3	0.00069	797	-15.86	-1.06	-15.05	-0.24	-14.00	0.81
353353	14	RIM	Main Population	PB	2	0.00063	816	-15.64	-1.24	-14.83	-0.43	-13.78	0.63
353353	15	RIM	Lead Loss	PB	1	0.00060	762	-16.84	-1.24	-16.02	-0.42	-14.97	0.63
353353	16	RIM	Main Population	PB	51	0.00105	728	-16.60	-0.18	-15.79	0.63	-14.73	1.69
353353	17	RIM	Lead Loss	PB	24	0.00080	752	-16.53	-0.70	-15.71	0.11	-14.66	1.16
353353	18	RIM	Main Population	PB	3	0.00063	776	-16.43	-1.16	-15.61	-0.34	-14.56	0.71
353353	19	RIM	Discordant	PB	40	0.00106	751	-16.06	-0.21	-15.25	0.61	-14.19	1.66
353353	20	RIM	Main Population	PB	16	0.00097	761	-16.02	-0.39	-15.20	0.42	-14.15	1.47
353353	21	RIM	Main Population	PB	5	0.00067	769	-16.50	-1.05	-15.69	-0.24	-14.63	0.82
353353	22	RIM	Main Population	PB	2	0.00062	793	-16.13	-1.23	-15.32	-0.41	-14.27	0.64
353353	23	RIM	Lead Loss	PB	18	0.00092	801	-15.28	-0.55	-14.46	0.26	-13.41	1.32

Table A1. 6 continued: Zircon calculated variables Ce^{4+}/Ce^{3+} ratios, Ti in Zr temperatures, and oxygen fugacity. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles.

Sample	Grain	Sector	Observation	Area	Ce^{4+}/Ce^{3+} zircon	Ce^{4+}/Ce^{3+} melt	Ti-in-Zr Temperature (°C)	log $fO2$ (4 wt. % H_2O)	log ΔFQM (4 wt. % H_2O)	log $fO2$ (6 wt. % H_2O)	log ΔFQM (6 wt. % H_2O)	log $fO2$ (9 wt. % H_2O)	log ΔFQM (9 wt. % H_2O)
353353	24	RIM	Main Population	PB	19	0.00087	781	-15.77	-0.60	-14.96	0.21	-13.91	1.26
353353	25	RIM	Main Population	PB	9	0.00096	775	-15.74	-0.44	-14.93	0.38	-13.88	1.43
353353	26	RIM	Lead Loss	PB	27	0.00113	727	-16.49	-0.05	-15.68	0.76	-14.63	1.82
353353	27	RIM	Main Population	PB	44	0.00131	651	-18.12	0.37	-17.30	1.19	-16.25	2.24
353353	28	RIM	Lead Loss	PB	17	0.00092	743	-16.50	-0.45	-15.68	0.36	-14.63	1.41
353353	29	RIM	Discordant	PB	20	0.00092	787	-15.57	-0.53	-14.75	0.28	-13.70	1.34
353353	30	RIM	Lead Loss	PB	127	0.00105	709	-17.05	-0.15	-16.23	0.67	-15.18	1.72
353353	31	RIM	Main Population	PB	14	0.00088	799	-15.39	-0.62	-14.57	0.20	-13.52	1.25
353353	32	RIM	Lead Loss	PB	86	0.00109	703	-17.11	-0.06	-16.30	0.76	-15.24	1.81
353353	33	RIM	Main Population	PB	2	0.00053	813	-16.00	-1.53	-15.18	-0.71	-14.13	0.34
353353	34	RIM	Main Population	PB	12	0.00083	766	-16.17	-0.67	-15.36	0.14	-14.31	1.19
353353	35	RIM	Discordant	PB	3	0.00076	794	-15.76	-0.87	-14.94	-0.06	-13.89	0.99
353353	36	RIM	Lead Loss	PB	1	0.00050	751	-17.38	-1.53	-16.57	-0.71	-15.52	0.34
353353	37	RIM	Inherited	PB	67	0.00124	685	-17.33	0.19	-16.52	1.01	-15.46	2.06
353353	38	RIM	Lead Loss	PB	128	0.00147	719	-16.21	0.42	-15.39	1.24	-14.34	2.29
353353	39	RIM	Main Population	PB	26	0.00091	771	-15.90	-0.51	-15.09	0.30	-14.04	1.35
353353	40	RIM	Lead Loss	PB	11	0.00082	787	-15.76	-0.73	-14.94	0.09	-13.89	1.14
353353	41	RIM	Discordant	PB	38	0.00093	740	-16.52	-0.41	-15.71	0.40	-14.66	1.46
353353	42	RIM	Main Population	PB	13	0.00089	767	-16.03	-0.54	-15.22	0.27	-14.17	1.33
353353	43	RIM	Main Population	PB	8	0.00060	774	-16.56	-1.24	-15.74	-0.42	-14.69	0.63
353353	44	RIM	Titanite/Apatite Inclusions	PB	9	0.00135	795	-14.73	0.13	-13.92	0.95	-12.87	2.00
353353	45	RIM	Discordant	PB	55	0.00116	635	-18.75	0.22	-17.93	1.03	-16.88	2.08
353353	46	RIM	Discordant	PB	12	0.00089	786	-15.63	-0.58	-14.82	0.23	-13.76	1.29

Table A1. 6 continued: Zircon calculated variables Ce^{4+}/Ce^{3+} ratios, Ti in Zr temperatures, and oxygen fugacity. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles.

Sample	Grain	Sector	Observation	Area	Ce^{4+}/Ce^{3+} zircon	Ce^{4+}/Ce^{3+} melt	Ti-in-Zr Temperature (°C)	log $fO2$ (4 wt. % H_2O)	log ΔFQM (4 wt. % H_2O)	log $fO2$ (6 wt. % H_2O)	log ΔFQM (6 wt. % H_2O)	log $fO2$ (9 wt. % H_2O)	log ΔFQM (9 wt. % H_2O)
353353	47	RIM	Main Population	PB	6	0.00089	803	-15.31	-0.62	-14.50	0.20	-13.45	1.25
353353	48	RIM	Main Population	PB	49	0.00102	738	-16.43	-0.25	-15.62	0.57	-14.56	1.62
353353	49	RIM	Main Population	PB	49	0.00099	771	-15.77	-0.36	-14.95	0.45	-13.90	1.51
353355	1	RIM	Main Population	PB	80	0.00102	757	-16.26	-0.55	-15.45	0.25	-14.41	1.30
353355	2	RIM	Main Population	PB	29	0.00072	777	-16.47	-1.20	-15.66	-0.40	-14.62	0.65
353355	3	RIM	Main Population	PB	2	0.00058	794	-16.49	-1.61	-15.69	-0.80	-14.64	0.24
353355	4	RIM	Lead Loss	PB	34	0.00104	788	-15.59	-0.57	-14.78	0.24	-13.74	1.28
353355	5	RIM	Discordant	PB	10	0.00075	775	-16.41	-1.11	-15.61	-0.31	-14.56	0.74
353355	6	RIM	Discordant	PB	8	0.00086	790	-15.88	-0.91	-15.07	-0.10	-14.03	0.94
353355	7	RIM	Main Population	PB	38	0.00085	766	-16.38	-0.88	-15.57	-0.07	-14.53	0.97
353355	8	RIM	Main Population	PB	8	0.00079	752	-16.80	-0.97	-15.99	-0.17	-14.95	0.88
353355	9	RIM	Inherited	PB	5	0.00077	800	-15.88	-1.12	-15.07	-0.31	-14.03	0.73
353355	10	RIM	Main Population	PB	5	0.00067	788	-16.35	-1.35	-15.55	-0.54	-14.50	0.50
353355	10	CORE	Main Population	PB	124	0.00092	674	-18.39	-0.55	-17.58	0.26	-16.54	1.30
353355	11	RIM	Main Population	PB	19	0.00093	779	-15.96	-0.75	-15.15	0.06	-14.11	1.10
353355	12	RIM	Main Population	PB	4	0.00068	797	-16.15	-1.32	-15.34	-0.52	-14.30	0.53
353355	13	RIM	Main Population	PB	6	0.00084	781	-16.11	-0.93	-15.30	-0.12	-14.26	0.92
353355	14	CORE	Main Population	PB	9	0.00073	801	-15.95	-1.22	-15.14	-0.41	-14.10	0.63
353355	14	MID	Main Population	PB	13	0.00076	792	-16.04	-1.12	-15.23	-0.31	-14.19	0.73
353355	14	MID	Lead Loss	PB	24	0.00086	792	-15.83	-0.90	-15.03	-0.10	-13.98	0.95
353355	14	RIM	Discordant	PB	24	0.00091	770	-16.18	-0.77	-15.37	0.04	-14.33	1.08
353355	15	RIM	Main Population	PB	19	0.00102	747	-16.48	-0.53	-15.67	0.28	-14.63	1.32
353355	16	RIM	Main Population	PB	67	0.00105	761	-16.13	-0.51	-15.32	0.30	-14.28	1.34

Table A1. 6 continued: Zircon calculated variables Ce^{4+}/Ce^{3+} ratios, Ti in Zr temperatures, and oxygen fugacity. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles.

Sample	Grain	Sector	Observation	Area	Ce^{4+}/Ce^{3+} zircon	Ce^{4+}/Ce^{3+} melt	Ti-in-Zr Temperature (°C)	log $fO2$ (4 wt. % H_2O)	log ΔFQM (4 wt. % H_2O)	log $fO2$ (6 wt. % H_2O)	log ΔFQM (6 wt. % H_2O)	log $fO2$ (9 wt. % H_2O)	log ΔFQM (9 wt. % H_2O)
353355	17	RIM	Main Population	PB	8	0.00074	802	-15.89	-1.18	-15.08	-0.38	-14.04	0.67
353355	18	RIM	Main Population	PB	45	0.00077	732	-17.31	-0.99	-16.50	-0.18	-15.46	0.86
353355	19	RIM	Lead Loss	PB	30	0.00086	805	-15.58	-0.94	-14.77	-0.13	-13.73	0.91
353355	20	RIM	Main Population	PB	12	0.00082	777	-16.23	-0.97	-15.42	-0.17	-14.38	0.88
353355	21	CORE	Inherited	PB	4	0.00021	803	-18.08	-3.40	-17.28	-2.59	-16.23	-1.55
353355	21	RIM	Inherited	PB	6	0.00022	763	-18.80	-3.23	-18.00	-2.42	-16.95	-1.38
353355	22	RIM	Main Population	PB	5	0.00067	790	-16.30	-1.34	-15.50	-0.54	-14.45	0.51
353355	23	RIM	Inherited	PB	3	0.00058	821	-15.93	-1.63	-15.12	-0.83	-14.08	0.22
353355	24	RIM	Main Population	PB	17	0.00115	764	-15.91	-0.36	-15.11	0.45	-14.06	1.49
353355	25	RIM	Main Population	PB	25	0.00090	777	-16.05	-0.80	-15.24	0.00	-14.20	1.05
353355	26	RIM	Inherited	PB	32	0.00095	689	-17.96	-0.54	-17.15	0.27	-16.10	1.31
353355	27	RIM	Main Population	PB	175	0.00125	715	-16.86	-0.10	-16.06	0.70	-15.01	1.75
353355	28	RIM	Main Population	PB	10	0.00076	763	-16.64	-1.07	-15.83	-0.26	-14.79	0.78
353355	29	RIM	Main Population	PB	77	0.00095	754	-16.44	-0.66	-15.63	0.15	-14.59	1.19
353355	30	RIM	Main Population	PB	59	0.00098	769	-16.07	-0.64	-15.26	0.17	-14.22	1.21
353355	31	RIM	Discordant	PB	25	0.00102	781	-15.77	-0.59	-14.96	0.21	-13.92	1.26
353355	32	RIM	Main Population	PB	44	0.00102	767	-16.06	-0.57	-15.25	0.24	-14.21	1.28
353355	33	RIM	Inherited	PB	26	0.00076	714	-17.73	-0.97	-16.93	-0.17	-15.88	0.88
353355	34	RIM	Main Population	PB	58	0.00086	718	-17.42	-0.76	-16.62	0.05	-15.57	1.09
353355	35	RIM	Main Population	PB	51	0.00099	769	-16.05	-0.62	-15.24	0.19	-14.20	1.23
353355	36	CORE	Main Population	PB	1	0.00050	831	-16.01	-1.91	-15.20	-1.10	-14.16	-0.06
353355	36	RIM	Main Population	PB	112	0.00099	739	-16.73	-0.57	-15.92	0.24	-14.88	1.28
353355	37	RIM	Discordant	PB	6	0.00077	806	-15.74	-1.12	-14.93	-0.31	-13.89	0.73

Table A1. 6 continued: Zircon calculated variables Ce^{4+}/Ce^{3+} ratios, Ti in Zr temperatures, and oxygen fugacity. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles.

Sample	Grain	Sector	Observation	Area	Ce^{4+}/Ce^{3+} zircon	Ce^{4+}/Ce^{3+} melt	Ti-in-Zr Temperature (°C)	log $fO2$ (4 wt. % H_2O)	log ΔFQM (4 wt. % H_2O)	log $fO2$ (6 wt. % H_2O)	log ΔFQM (6 wt. % H_2O)	log $fO2$ (9 wt. % H_2O)	log ΔFQM (9 wt. % H_2O)
353355	38	RIM	Main Population	PB	31	0.00099	796	-15.51	-0.68	-14.71	0.13	-13.66	1.17
353355	39	RIM	Main Population	PB	45	0.00115	755	-16.11	-0.33	-15.30	0.47	-14.26	1.52
353355	40	RIM	Main Population	PB	40	0.00089	770	-16.23	-0.80	-15.42	0.00	-14.38	1.05
353355	41	RIM	Main Population	PB	7	0.00083	770	-16.34	-0.93	-15.54	-0.13	-14.49	0.92
353355	42	RIM	Discordant	PB	20	0.00096	791	-15.66	-0.71	-14.85	0.09	-13.81	1.14
353355	43	RIM	Discordant	PB	25	0.00092	772	-16.11	-0.75	-15.30	0.06	-14.26	1.10
353355	44	CORE	Main Population	PB	5	0.00067	786	-16.40	-1.34	-15.59	-0.53	-14.55	0.51
353355	44	RIM	Main Population	PB	28	0.00101	786	-15.68	-0.62	-14.87	0.19	-13.83	1.23
353355	45	RIM	Main Population	PB	86	0.00101	725	-17.01	-0.51	-16.21	0.30	-15.16	1.34
353355	46	RIM	Main Population	PB	22	0.00108	783	-15.62	-0.49	-14.82	0.31	-13.77	1.36
353355	47	RIM	Main Population	PB	39	0.00098	784	-15.78	-0.66	-14.97	0.14	-13.93	1.19
353355	48	RIM	Main Population	PB	29	0.00093	758	-16.40	-0.70	-15.59	0.10	-14.55	1.15
353355	49	RIM	Main Population	PB	11	0.00077	771	-16.45	-1.06	-15.64	-0.25	-14.60	0.79
353355	50	RIM	Main Population	PB	152	0.00119	764	-15.84	-0.30	-15.04	0.51	-13.99	1.55
353358	1	RIM	Main Population	PB	15	0.00173	749	-15.06	0.85	-14.25	1.66	-13.20	2.71
353358	2	RIM	Main Population	PB	3	0.00104	803	-14.83	-0.14	-14.02	0.67	-12.97	1.72
353358	3	RIM	Main Population	PB	4	0.00137	773	-14.95	0.40	-14.13	1.21	-13.08	2.26
353358	4	RIM	Inherited	PB	15	0.00155	790	-14.39	0.58	-13.57	1.39	-12.52	2.44
353358	5	RIM	Main Population	PB	154	0.00286	628	-17.18	2.00	-16.37	2.81	-15.32	3.86
353358	6	RIM	Main Population	PB	24	0.00172	780	-14.41	0.78	-13.60	1.59	-12.55	2.64
353358	7	RIM	Inherited	PB	1	0.00061	757	-16.68	-0.97	-15.87	-0.16	-14.82	0.89
353358	8	RIM	Main Population	PB	135	0.00269	705	-15.30	1.70	-14.49	2.52	-13.44	3.56
353358	9	RIM	Main Population	PB	3	0.00125	769	-15.20	0.24	-14.39	1.05	-13.34	2.10

Table A1. 6 continued: Zircon calculated variables Ce^{4+}/Ce^{3+} ratios, Ti in Zr temperatures, and oxygen fugacity. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles.

Sample	Grain	Sector	Observation	Area	Ce^{4+}/Ce^{3+} zircon	Ce^{4+}/Ce^{3+} melt	Ti-in-Zr Temperature (°C)	log $fO2$ (4 wt. % H_2O)	log ΔFQM (4 wt. % H_2O)	log $fO2$ (6 wt. % H_2O)	log ΔFQM (6 wt. % H_2O)	log $fO2$ (9 wt. % H_2O)	log ΔFQM (9 wt. % H_2O)
353358	10	RIM	Main Population	PB	44	0.00196	738	-15.09	1.08	-14.28	1.89	-13.23	2.94
353358	11	RIM	Discordant	PB	13	0.00205	767	-14.37	1.11	-13.56	1.92	-12.51	2.97
353358	13	RIM	Main Population	PB	117	0.00286	681	-15.78	1.87	-14.97	2.68	-13.92	3.73
353358	14	RIM	Main Population	PB	13	0.00156	806	-14.07	0.56	-13.26	1.37	-12.21	2.42
353358	15	RIM	Inherited	PB	20	0.00154	702	-16.34	0.74	-15.53	1.55	-14.48	2.60
353358	16	RIM	Inherited	PB	33	0.00181	787	-14.18	0.86	-13.37	1.67	-12.32	2.72
353358	17	RIM	Main Population	PB	21	0.00180	790	-14.13	0.84	-13.32	1.65	-12.27	2.70
353358	18	RIM	Discordant	PB	37	0.00196	743	-14.98	1.08	-14.17	1.89	-13.12	2.94
353358	19	RIM	Main Population	PB	14	0.00162	765	-14.84	0.70	-14.03	1.52	-12.98	2.56
353358	20	RIM	Main Population	PB	15	0.00199	719	-15.50	1.15	-14.69	1.96	-13.64	3.01
353358	21	RIM	Main Population	PB	12	0.00157	754	-15.11	0.67	-14.30	1.48	-13.25	2.53
353358	22	RIM	Main Population	PB	60	0.00182	752	-14.90	0.93	-14.09	1.74	-13.04	2.79
353358	23	RIM	Main Population	PB	124	0.00275	720	-14.91	1.71	-14.10	2.53	-13.05	3.58
353358	24	RIM	Main Population	PB	5	0.00125	793	-14.70	0.20	-13.89	1.01	-12.84	2.06
353358	25	RIM	Main Population	PB	22	0.00154	775	-14.70	0.59	-13.89	1.41	-12.84	2.46
353358	26	RIM	Main Population	PB	218	0.00297	722	-14.74	1.84	-13.92	2.65	-12.88	3.70
353358	27	RIM	Main Population	PB	31	0.00185	739	-15.17	0.98	-14.35	1.79	-13.30	2.84
353358	28	RIM	Main Population	PB	15	0.00163	784	-14.43	0.67	-13.62	1.48	-12.57	2.53
353358	29	RIM	Main Population	PB	70	0.00270	692	-15.62	1.74	-14.80	2.56	-13.75	3.60
353358	30	RIM	Discordant	PB	19	0.00173	780	-14.41	0.79	-13.60	1.60	-12.55	2.65
353358	31	RIM	Main Population	PB	14	0.00165	757	-14.96	0.75	-14.15	1.56	-13.10	2.61
353358	32	RIM	Main Population	PB	53	0.00218	773	-14.15	1.20	-13.34	2.02	-12.29	3.07
353358	33	RIM	Main Population	PB	25	0.00242	759	-14.27	1.41	-13.46	2.22	-12.41	3.27

Table A1. 6 continued: Zircon calculated variables Ce^{4+}/Ce^{3+} ratios, Ti in Zr temperatures, and oxygen fugacity. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles.

Sample	Grain	Sector	Observation	Area	Ce^{4+}/Ce^{3+} zircon	Ce^{4+}/Ce^{3+} melt	Ti-in-Zr Temperature (°C)	log $fO2$ (4 wt. % H_2O)	log ΔFQM (4 wt. % H_2O)	log $fO2$ (6 wt. % H_2O)	log ΔFQM (6 wt. % H_2O)	log $fO2$ (9 wt. % H_2O)	log ΔFQM (9 wt. % H_2O)
353358	34	RIM	Titanite/Apatite Inclusions	PB	10	0.00281	691	-15.57	1.81	-14.76	2.62	-13.71	3.67
353358	35	RIM	Main Population	PB	154	0.00259	718	-15.07	1.61	-14.26	2.42	-13.21	3.47
353358	36	CORE	Main Population	PB	3	0.00113	801	-14.71	0.01	-13.90	0.82	-12.85	1.87
353358	36	MID	Main Population	PB	11	0.00166	792	-14.23	0.69	-13.41	1.51	-12.37	2.56
353358	36	RIM	Inherited	PB	52	0.00179	744	-15.12	0.91	-14.31	1.72	-13.26	2.77
353358	37	RIM	Main Population	PB	21	0.00163	762	-14.88	0.72	-14.07	1.53	-13.02	2.58
353358	38	RIM	Main Population	PB	146	0.00273	666	-16.24	1.82	-15.43	2.64	-14.38	3.69
353358	39	RIM	Inherited	PB	19	0.00158	784	-14.49	0.62	-13.67	1.43	-12.63	2.48
353358	40	RIM	Inherited	PB	24	0.00205	768	-14.36	1.11	-13.55	1.92	-12.50	2.97
353358	41	RIM	Main Population	PB	5	0.00108	800	-14.82	-0.06	-14.01	0.75	-12.96	1.80
353358	42	RIM	Main Population	PB	90	0.00194	703	-15.92	1.14	-15.11	1.95	-14.06	3.00
353358	43	RIM	Main Population	PB	59	0.00171	713	-15.88	0.90	-15.07	1.71	-14.02	2.76
353358	44	RIM	Main Population	PB	64	0.00189	748	-14.92	1.01	-14.11	1.82	-13.06	2.87
353358	45	CORE	Main Population	PB	7	0.00134	786	-14.73	0.33	-13.92	1.14	-12.87	2.19
353358	45	RIM	Discordant	PB	27	0.00153	758	-15.07	0.62	-14.26	1.43	-13.21	2.48
353358	46	RIM	Lead Loss	PB	101	0.00307	739	-14.29	1.86	-13.48	2.67	-12.43	3.72
353358	47	CORE	Lead Loss	PB	7	0.00154	829	-13.64	0.49	-12.83	1.31	-11.78	2.36
353358	47	RIM	Inherited	PB	45	0.00171	750	-15.06	0.82	-14.24	1.64	-13.20	2.69
353358	48	RIM	Main Population	PB	32	0.00175	782	-14.34	0.80	-13.53	1.61	-12.48	2.66
353358	49	RIM	Main Population	PB	58	0.00278	692	-15.57	1.79	-14.76	2.60	-13.71	3.65
353362	1	RIM	Inherited	PS	15	0.00091	738	-16.73	-0.56	-15.92	0.25	-14.87	1.30
353362	2	RIM	Main Population	PS	8	0.00076	771	-16.33	-0.93	-15.51	-0.12	-14.47	0.92
353362	3	RIM	Main Population	PS	48	0.00083	704	-17.70	-0.66	-16.89	0.15	-15.84	1.20

Table A1. 6 continued: Zircon calculated variables Ce^{4+}/Ce^{3+} ratios, Ti in Zr temperatures, and oxygen fugacity. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles.

Sample	Grain	Sector	Observation	Area	Ce^{4+}/Ce^{3+} zircon	Ce^{4+}/Ce^{3+} melt	Ti-in-Zr Temperature (°C)	log $fO2$ (4 wt. % H_2O)	log ΔFQM (4 wt. % H_2O)	log $fO2$ (6 wt. % H_2O)	log ΔFQM (6 wt. % H_2O)	log $fO2$ (9 wt. % H_2O)	log ΔFQM (9 wt. % H_2O)
353362	4	RIM	Rejected	PS	2	0.00043	729	-18.24	-1.83	-17.43	-1.02	-16.38	0.03
353362	5	RIM	Main Population	PS	459	0.00096	690	-17.78	-0.37	-16.97	0.44	-15.92	1.49
353362	6	RIM	Main Population	PS	38	0.00077	715	-17.55	-0.80	-16.74	0.01	-15.70	1.06
353362	6	CORE	Lead Loss	PS	17	0.00091	750	-16.47	-0.58	-15.66	0.23	-14.61	1.27
353362	7	RIM	Inherited	PS	9	0.00056	745	-17.43	-1.42	-16.62	-0.61	-15.57	0.44
353362	8	RIM	Main Population	PS	22	0.00061	711	-18.07	-1.21	-17.26	-0.40	-16.21	0.65
353362	9	RIM	Main Population	PS	184	0.00144	636	-18.48	0.47	-17.67	1.28	-16.62	2.33
353362	10	RIM	Main Population	PS	32	0.00088	757	-16.37	-0.67	-15.56	0.14	-14.52	1.19
353362	11	RIM	Inherited	PS	72	0.00069	706	-17.95	-0.99	-17.14	-0.18	-16.10	0.87
353362	12	CORE	Inherited	PS	2	0.00055	771	-16.91	-1.51	-16.10	-0.70	-15.05	0.34
353362	12	RIM	Inherited	PS	26	0.00080	757	-16.54	-0.83	-15.73	-0.02	-14.68	1.03
353362	13	RIM	Inherited	PS	5	0.00080	789	-15.87	-0.88	-15.06	-0.07	-14.01	0.98
353362	14	RIM	Inherited	PS	114	0.00091	669	-18.41	-0.42	-17.59	0.39	-16.55	1.44
353362	15	RIM	Main Population	PS	34	0.00098	746	-16.44	-0.46	-15.63	0.35	-14.58	1.40
353362	16	RIM	Main Population	PS	35	0.00075	717	-17.56	-0.87	-16.75	-0.06	-15.70	0.99
353362	17	RIM	Main Population	PS	100	0.00084	706	-17.61	-0.64	-16.80	0.17	-15.76	1.22
353362	18	RIM	Main Population	PS	77	0.00101	865	-14.05	-0.61	-13.24	0.20	-12.19	1.24
353362	19	RIM	Main Population	PS	69	0.00083	702	-17.74	-0.65	-16.93	0.16	-15.88	1.21
353362	20	CORE	Inherited	PS	16	0.00070	712	-17.79	-0.97	-16.97	-0.16	-15.93	0.89
353362	20	RIM	Main Population	PS	32	0.00079	699	-17.88	-0.73	-17.07	0.08	-16.02	1.13
353362	21	RIM	Main Population	PS	32	0.00071	735	-17.26	-1.00	-16.45	-0.19	-15.40	0.86
353362	22	CORE	Main Population	PS	37	0.00078	689	-18.16	-0.73	-17.35	0.09	-16.30	1.13
353362	22	RIM	Lead Loss	PS	96	0.00082	738	-16.93	-0.75	-16.12	0.06	-15.07	1.11

Table A1. 6 continued: Zircon calculated variables Ce^{4+}/Ce^{3+} ratios, Ti in Zr temperatures, and oxygen fugacity. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles.

Sample	Grain	Sector	Observation	Area	Ce^{4+}/Ce^{3+} zircon	Ce^{4+}/Ce^{3+} melt	Ti-in-Zr Temperature (°C)	log $fO2$ (4 wt. % H_2O)	log ΔFQM (4 wt. % H_2O)	log $fO2$ (6 wt. % H_2O)	log ΔFQM (6 wt. % H_2O)	log $fO2$ (9 wt. % H_2O)	log ΔFQM (9 wt. % H_2O)
353362	23	CORE	Main Population	PS	20	0.00077	698	-17.95	-0.76	-17.14	0.05	-16.09	1.10
353362	23	RIM	Main Population	PS	103	0.00099	713	-17.15	-0.37	-16.34	0.44	-15.29	1.49
353362	24	RIM	Main Population	PS	16	0.00162	752	-15.41	0.41	-14.60	1.22	-13.55	2.27
353362	25	RIM	Main Population	PS	76	0.00080	689	-18.12	-0.69	-17.31	0.12	-16.26	1.17
353362	26	RIM	Main Population	PS	80	0.00093	885	-13.84	-0.79	-13.03	0.02	-11.98	1.06
353362	27	RIM	Main Population	PS	27	0.00077	689	-18.17	-0.74	-17.36	0.07	-16.32	1.12
353362	28	RIM	Main Population	PS	8	0.00096	736	-16.69	-0.47	-15.88	0.34	-14.83	1.39
353362	29	RIM	Lead Loss	PS	85	0.00171	725	-15.93	0.55	-15.12	1.37	-14.07	2.41
353362	30	RIM	Inherited	PS	42	0.00078	752	-16.70	-0.87	-15.89	-0.06	-14.84	0.99
353362	31	RIM	Lead Loss	PS	26	0.00106	773	-15.71	-0.37	-14.90	0.44	-13.85	1.49
353362	32	RIM	Discordant	PS	9	0.00086	778	-15.97	-0.74	-15.16	0.07	-14.11	1.12
353362	33	RIM	Lead Loss	PS	13	0.00086	727	-17.09	-0.64	-16.28	0.17	-15.23	1.21
353362	34	RIM	Inherited	PS	31	0.00071	686	-18.40	-0.88	-17.59	-0.07	-16.54	0.97
353362	34	CORE	Inherited	PS	39	0.00195	687	-16.61	0.87	-15.80	1.68	-14.75	2.73
353362	35	CORE	Lead Loss	PS	18	0.00075	677	-18.51	-0.77	-17.70	0.04	-16.66	1.09
353362	35	RIM	Main Population	PS	283	0.00089	650	-18.93	-0.41	-18.12	0.40	-17.07	1.45
353362	36	RIM	Main Population	PS	48	0.00093	671	-18.30	-0.38	-17.49	0.43	-16.44	1.48
353362	37	RIM	Main Population	PS	119	0.00093	633	-19.32	-0.28	-18.51	0.53	-17.47	1.58
353362	38	RIM	Rejected	PS	39	0.00070	766	-16.58	-1.06	-15.77	-0.25	-14.72	0.79
353362	39	RIM	Discordant	PS	187	0.00118	623	-19.17	0.16	-18.36	0.97	-17.31	2.02
353362	40	CORE	Discordant	PS	39	0.00066	713	-17.87	-1.07	-17.06	-0.26	-16.01	0.79
353362	40	RIM	Main Population	PS	241	0.00138	631	-18.69	0.41	-17.88	1.22	-16.83	2.27
353362	41	RIM	Main Population	PS	51	0.00112	745	-16.21	-0.21	-15.40	0.60	-14.35	1.65

Table A1. 6 continued: Zircon calculated variables Ce^{4+}/Ce^{3+} ratios, Ti in Zr temperatures, and oxygen fugacity. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles.

Sample	Grain	Sector	Observation	Area	Ce^{4+}/Ce^{3+} zircon	Ce^{4+}/Ce^{3+} melt	Ti-in-Zr Temperature (°C)	log $fO2$ (4 wt. % H_2O)	log ΔFQM (4 wt. % H_2O)	log $fO2$ (6 wt. % H_2O)	log ΔFQM (6 wt. % H_2O)	log $fO2$ (9 wt. % H_2O)	log ΔFQM (9 wt. % H_2O)
353362	41	CORE	Main Population	PS	97	0.00137	633	-18.65	0.39	-17.84	1.20	-16.79	2.25
353362	42	RIM	Discordant	PS	6	0.00072	739	-17.13	-0.98	-16.32	-0.17	-15.27	0.88
353362	43	RIM	Main Population	PS	12	0.00087	760	-16.34	-0.69	-15.53	0.12	-14.49	1.17
353362	44	RIM	Main Population	PS	44	0.00097	724	-16.95	-0.43	-16.14	0.38	-15.09	1.43
353362	44	CORE	Lead Loss	PS	116	0.00120	693	-17.31	0.01	-16.50	0.82	-15.45	1.87
353362	46	RIM	Main Population	PS	56	0.00072	704	-17.92	-0.90	-17.11	-0.09	-16.06	0.96
353362	48	RIM	Main Population	PS	3	0.00067	783	-16.32	-1.19	-15.51	-0.38	-14.46	0.67
353362	49	RIM	Main Population	PS	34	0.00083	789	-15.81	-0.82	-15.00	-0.01	-13.95	1.04
353363	1	CORE	Main Population	PS	18	0.00061	743	-17.00	-0.95	-16.18	-0.14	-15.13	0.92
353363	1	RIM	Inherited	PS	8	0.00063	739	-17.03	-0.88	-16.21	-0.07	-15.16	0.99
353363	2	RIM	Inherited	PS	4	0.00052	782	-16.44	-1.29	-15.62	-0.48	-14.57	0.57
353363	3	RIM	Main Population	PS	23	0.00058	702	-18.02	-0.94	-17.21	-0.13	-16.15	0.93
353363	4	RIM	Main Population	PS	6	0.00066	769	-16.31	-0.86	-15.49	-0.04	-14.44	1.01
353363	5	RIM	Main Population	PS	40	0.00076	754	-16.38	-0.59	-15.57	0.23	-14.51	1.28
353363	6	RIM	Discordant	PS	218	0.00124	822	-14.14	0.14	-13.32	0.96	-12.27	2.01
353363	7	RIM	Inherited	PS	3	0.00030	851	-16.04	-2.34	-15.23	-1.53	-14.17	-0.48
353363	8	RIM	Main Population	PS	89	0.00108	677	-17.55	0.20	-16.73	1.01	-15.68	2.07
353363	9	RIM	Main Population	PS	162	0.00084	750	-16.29	-0.40	-15.47	0.41	-14.42	1.47
353363	10	RIM	Main Population	PS	31	0.00118	735	-16.04	0.22	-15.22	1.03	-14.17	2.09
353363	11	RIM	Main Population	PS	50	0.00124	785	-14.86	0.20	-14.05	1.02	-13.00	2.07
353363	12	RIM	Discordant	PS	42	0.00080	733	-16.74	-0.45	-15.93	0.36	-14.88	1.42
353363	13	RIM	Main Population	PS	113	0.00112	742	-15.95	0.13	-15.14	0.94	-14.09	1.99
353363	14	RIM	Inherited	PS	187	0.00086	674	-18.02	-0.18	-17.20	0.63	-16.15	1.69

Table A1. 6 continued: Zircon calculated variables Ce^{4+}/Ce^{3+} ratios, Ti in Zr temperatures, and oxygen fugacity. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles.

Sample	Grain	Sector	Observation	Area	Ce^{4+}/Ce^{3+} zircon	Ce^{4+}/Ce^{3+} melt	Ti-in-Zr Temperature (°C)	log $fO2$ (4 wt. % H_2O)	log ΔFQM (4 wt. % H_2O)	log $fO2$ (6 wt. % H_2O)	log ΔFQM (6 wt. % H_2O)	log $fO2$ (9 wt. % H_2O)	log ΔFQM (9 wt. % H_2O)
353363	15	RIM	Main Population	PS	10	0.00063	784	-16.09	-0.97	-15.27	-0.16	-14.22	0.89
353363	16	RIM	Discordant	PS	48	0.00089	694	-17.48	-0.18	-16.66	0.64	-15.61	1.69
353363	17	RIM	Titanite/Apatite Inclusions	PS	25	0.00064	1529	-7.12	-1.96	-6.30	-1.14	-5.25	-0.09
353363	18	RIM	Discordant	PS	51	0.00084	695	-17.54	-0.29	-16.73	0.53	-15.67	1.58
353363	19	RIM	Main Population	PS	143	0.00151	736	-15.57	0.64	-14.76	1.46	-13.71	2.51
353363	20	RIM	Main Population	PS	132	0.00097	666	-18.02	0.04	-17.21	0.86	-16.15	1.91
353363	21	RIM	Main Population	PS	122	0.00111	685	-17.32	0.23	-16.50	1.04	-15.45	2.09
353363	22	CORE	Inherited	PS	17	0.00064	741	-16.94	-0.84	-16.12	-0.03	-15.07	1.02
353363	22	RIM	Main Population	PS	72	0.00093	700	-17.25	-0.11	-16.44	0.70	-15.38	1.76
353363	23	RIM	Main Population	PS	30	0.00104	670	-17.80	0.15	-16.98	0.97	-15.93	2.02
353363	25	RIM	Inherited	PS	285	0.00133	696	-16.72	0.52	-15.91	1.33	-14.85	2.38
353363	26	RIM	Rejected	PS	2	0.00117	719	-16.41	0.24	-15.59	1.06	-14.54	2.11
353363	27	RIM	Inherited	PS	87	0.00092	742	-16.31	-0.23	-15.49	0.59	-14.44	1.64
353363	28	RIM	Main Population	PS	119	0.00126	707	-16.55	0.40	-15.74	1.21	-14.68	2.26
353363	29	RIM	Discordant	PS	47	0.00059	700	-18.06	-0.92	-17.24	-0.10	-16.19	0.95
353363	30	RIM	Inherited	PS	57	0.00127	705	-16.58	0.41	-15.77	1.22	-14.71	2.28
353363	31	RIM	Main Population	PS	9	0.00068	772	-16.17	-0.81	-15.36	0.01	-14.31	1.06
353363	32	RIM	Discordant	PS	26	0.00090	672	-18.02	-0.12	-17.20	0.70	-16.15	1.75
353363	33	RIM	Inherited	PS	69	0.00039	700	-18.77	-1.64	-17.95	-0.82	-16.90	0.23
353363	34	RIM	Main Population	PS	101	0.00118	761	-15.45	0.18	-14.63	0.99	-13.58	2.04
353363	35	RIM	Main Population	PS	28	0.00078	774	-15.89	-0.57	-15.08	0.24	-14.02	1.29
353363	36	RIM	Main Population	PS	115	0.00098	735	-16.36	-0.10	-15.54	0.71	-14.49	1.77
353363	37	RIM	Main Population	PS	56	0.00082	740	-16.53	-0.41	-15.71	0.40	-14.66	1.46

Table A1. 6 continued: Zircon calculated variables Ce^{4+}/Ce^{3+} ratios, Ti in Zr temperatures, and oxygen fugacity. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles.

Sample	Grain	Sector	Observation	Area	Ce^{4+}/Ce^{3+} zircon	Ce^{4+}/Ce^{3+} melt	Ti-in-Zr Temperature (°C)	log $fO2$ (4 wt. % H_2O)	log ΔFQM (4 wt. % H_2O)	log $fO2$ (6 wt. % H_2O)	log ΔFQM (6 wt. % H_2O)	log $fO2$ (9 wt. % H_2O)	log ΔFQM (9 wt. % H_2O)
353363	38	RIM	Discordant	PS	16	0.00071	698	-17.77	-0.59	-16.95	0.23	-15.90	1.28
353363	39	RIM	Main Population	PS	194	0.00096	743	-16.19	-0.15	-15.38	0.67	-14.33	1.72
353363	40	RIM	Titanite/Apatite Inclusions	PS	1	0.00051	866	-14.86	-1.45	-14.04	-0.64	-12.99	0.41
353363	41	RIM	Main Population	PS	80	0.00095	730	-16.51	-0.14	-15.69	0.68	-14.64	1.73
353363	42	RIM	Main Population	PS	34	0.00080	754	-16.28	-0.48	-15.46	0.33	-14.41	1.39
353363	43	RIM	Inherited	PS	49	0.00057	726	-17.50	-1.02	-16.69	-0.21	-15.64	0.84
353363	44	RIM	Inherited	PS	11	0.00069	791	-15.77	-0.82	-14.95	-0.01	-13.90	1.05
353363	45	RIM	Inherited	PS	45	0.00089	781	-15.54	-0.36	-14.72	0.46	-13.67	1.51
353363	46	RIM	Rejected	PS	27	0.00094	1446	-7.06	-1.18	-6.25	-0.37	-5.20	0.69
353363	47	CORE	Main Population	PS	3	0.00052	768	-16.72	-1.26	-15.91	-0.44	-14.86	0.61
353363	47	RIM	Main Population	PS	45	0.00084	699	-17.46	-0.29	-16.64	0.53	-15.59	1.58
353363	48	RIM	Inherited	PS	6	0.00058	764	-16.63	-1.06	-15.81	-0.25	-14.76	0.81
353363	49	RIM	Main Population	PS	4	0.00059	761	-16.67	-1.04	-15.86	-0.22	-14.80	0.83
353368	1	RIM	Main Population	PS	86	0.00072	722	-17.36	-0.78	-16.55	0.03	-15.50	1.08
353368	2	RIM	Main Population	PS	22	0.00080	770	-16.12	-0.70	-15.31	0.11	-14.26	1.16
353368	3	RIM	Main Population	PS	20	0.00093	817	-14.92	-0.53	-14.11	0.29	-13.06	1.34
353368	4	RIM	Main Population	PS	37	0.00081	764	-16.23	-0.67	-15.42	0.14	-14.37	1.19
353368	5	CORE	Main Population	PS	27	0.00067	760	-16.63	-0.98	-15.81	-0.17	-14.77	0.88
353368	5	RIM	Main Population	PS	71	0.00076	745	-16.76	-0.75	-15.95	0.06	-14.90	1.11
353368	6	RIM	Main Population	PS	181	0.00098	652	-18.55	-0.09	-17.74	0.72	-16.69	1.77
353368	7	RIM	Inherited	PS	34	0.00081	740	-16.74	-0.63	-15.93	0.18	-14.88	1.23
353368	8	RIM	Main Population	PS	7	0.00069	773	-16.30	-0.96	-15.49	-0.15	-14.44	0.90
353368	9	RIM	Inherited	PS	30	0.00074	732	-17.08	-0.76	-16.27	0.05	-15.22	1.10

Table A1. 6 continued: Zircon calculated variables Ce^{4+}/Ce^{3+} ratios, Ti in Zr temperatures, and oxygen fugacity. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles.

Sample	Grain	Sector	Observation	Area	Ce^{4+}/Ce^{3+} zircon	Ce^{4+}/Ce^{3+} melt	Ti-in-Zr Temperature (°C)	log $fO2$ (4 wt. % H_2O)	log ΔFQM (4 wt. % H_2O)	log $fO2$ (6 wt. % H_2O)	log ΔFQM (6 wt. % H_2O)	log $fO2$ (9 wt. % H_2O)	log ΔFQM (9 wt. % H_2O)
353368	10	RIM	Main Population	PS	58	0.00065	696	-18.15	-0.91	-17.33	-0.10	-16.29	0.95
353368	10	CORE	Inherited	PS	6	0.00065	750	-16.90	-1.01	-16.09	-0.20	-15.04	0.85
353368	11	RIM	Main Population	PS	13	0.00077	786	-15.86	-0.80	-15.05	0.01	-14.00	1.06
353368	12	RIM	Main Population	PS	38	0.00067	731	-17.27	-0.93	-16.45	-0.12	-15.41	0.93
353368	13	RIM	Inherited	PS	7	0.00074	770	-16.26	-0.84	-15.45	-0.02	-14.40	1.02
353368	14	RIM	Main Population	PS	9	0.00069	784	-16.09	-0.99	-15.28	-0.18	-14.23	0.87
353368	15	RIM	Discordant	PS	29	0.00084	773	-15.96	-0.61	-15.14	0.20	-14.10	1.25
353368	16	RIM	Main Population	PS	26	0.00073	764	-16.40	-0.86	-15.59	-0.05	-14.54	1.00
353368	17	RIM	Main Population	PS	24	0.00084	775	-15.93	-0.63	-15.12	0.18	-14.07	1.23
353368	18	RIM	Main Population	PS	10	0.00079	775	-16.03	-0.73	-15.21	0.08	-14.16	1.13
353368	19	RIM	Main Population	PS	132	0.00121	742	-16.00	0.08	-15.19	0.89	-14.14	1.94
353368	20	RIM	Main Population	PS	64	0.00066	672	-18.73	-0.84	-17.92	-0.02	-16.87	1.02
353368	22	RIM	Discordant	PS	114	0.00075	719	-17.33	-0.70	-16.52	0.11	-15.47	1.16
353368	23	RIM	Main Population	PS	20	0.00075	726	-17.20	-0.73	-16.39	0.08	-15.34	1.13
353368	24	RIM	Main Population	PS	4	0.00064	784	-16.21	-1.11	-15.40	-0.30	-14.35	0.75
353368	25	RIM	Inherited	PS	35	0.00076	768	-16.26	-0.79	-15.45	0.02	-14.40	1.07
353368	26	RIM	Main Population	PS	41	0.00090	767	-15.99	-0.49	-15.17	0.32	-14.12	1.37
353368	27	RIM	Main Population	PS	10	0.00092	781	-15.65	-0.47	-14.84	0.34	-13.79	1.39
353368	28	RIM	Main Population	PS	38	0.00068	728	-17.33	-0.91	-16.51	-0.09	-15.47	0.96
353368	29	RIM	Lead Loss	PS	12	0.00094	815	-14.92	-0.50	-14.11	0.31	-13.06	1.36
353368	30	RIM	Main Population	PS	65	0.00084	689	-17.87	-0.45	-17.06	0.36	-16.01	1.41
353368	31	RIM	Main Population	PS	16	0.00079	781	-15.90	-0.74	-15.09	0.08	-14.04	1.12
353368	32	RIM	Main Population	PS	252	0.00154	701	-16.53	0.58	-15.72	1.39	-14.67	2.44

Table A1. 6 continued: Zircon calculated variables Ce^{4+}/Ce^{3+} ratios, Ti in Zr temperatures, and oxygen fugacity. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles.

Sample	Grain	Sector	Observation	Area	Ce^{4+}/Ce^{3+} zircon	Ce^{4+}/Ce^{3+} melt	Ti-in-Zr Temperature (°C)	log $fO2$ (4 wt. % H_2O)	log ΔFQM (4 wt. % H_2O)	log $fO2$ (6 wt. % H_2O)	log ΔFQM (6 wt. % H_2O)	log $fO2$ (9 wt. % H_2O)	log ΔFQM (9 wt. % H_2O)
353368	33	RIM	Inherited	PS	6	0.00070	758	-16.61	-0.92	-15.80	-0.11	-14.75	0.94
353368	34	RIM	Main Population	PS	8	0.00070	779	-16.17	-0.96	-15.36	-0.14	-14.31	0.91
353368	35	RIM	Main Population	PS	87	0.00096	721	-16.86	-0.28	-16.05	0.53	-15.00	1.58
353368	36	RIM	Main Population	PS	152	0.00069	619	-20.07	-0.60	-19.26	0.22	-18.21	1.26
353368	37	RIM	Main Population	PS	59	0.00076	771	-16.19	-0.80	-15.38	0.02	-14.33	1.06
353368	38	RIM	Inherited	PS	132	0.00079	677	-18.30	-0.53	-17.49	0.28	-16.44	1.33
353368	39	RIM	Inherited	PS	49	0.00069	707	-17.78	-0.83	-16.97	-0.02	-15.92	1.03
353368	40	RIM	Main Population	PS	66	0.00075	703	-17.73	-0.67	-16.92	0.14	-15.87	1.19
353368	41	RIM	Main Population	PS	8	0.00074	762	-16.41	-0.81	-15.59	0.00	-14.55	1.05
353368	42	RIM	Main Population	PS	37	0.00071	712	-17.61	-0.78	-16.80	0.03	-15.75	1.08
353368	43	RIM	Discordant	PS	6	0.00068	784	-16.09	-1.00	-15.28	-0.19	-14.23	0.86
353368	44	RIM	Main Population	PS	9	0.00080	811	-15.29	-0.77	-14.48	0.04	-13.43	1.09
353368	45	RIM	Main Population	PS	34	0.00096	787	-15.44	-0.41	-14.63	0.40	-13.58	1.45
353368	46	RIM	Main Population	PS	5	0.00064	806	-15.77	-1.15	-14.96	-0.34	-13.91	0.71
353368	48	RIM	Main Population	PS	4	0.00066	767	-16.53	-1.03	-15.72	-0.22	-14.67	0.83
353368	49	RIM	Main Population	PS	34	0.00064	698	-18.13	-0.94	-17.32	-0.13	-16.27	0.92
353369	1	RIM	Main Population	PS	44	0.00103	719	-16.61	0.04	-15.79	0.86	-14.74	1.91
353369	2	RIM	Main Population	PS	57	0.00075	698	-17.65	-0.46	-16.83	0.35	-15.78	1.41
353369	2	CORE	Main Population	PS	90	0.00154	710	-16.12	0.75	-15.30	1.57	-14.25	2.62
353369	3	RIM	Main Population	PS	119	0.00095	732	-16.45	-0.12	-15.63	0.69	-14.58	1.75
353369	4	RIM	Main Population	PS	120	0.00161	661	-17.25	0.95	-16.43	1.77	-15.38	2.82
353369	5	RIM	Inherited	PS	21	0.00096	760	-15.82	-0.17	-15.01	0.65	-13.95	1.70
353369	6	RIM	Main Population	PS	37	0.00078	722	-17.02	-0.46	-16.21	0.36	-15.15	1.41

Table A1. 6 continued: Zircon calculated variables Ce^{4+}/Ce^{3+} ratios, Ti in Zr temperatures, and oxygen fugacity. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles.

Sample	Grain	Sector	Observation	Area	Ce^{4+}/Ce^{3+} zircon	Ce^{4+}/Ce^{3+} melt	Ti-in-Zr Temperature (°C)	log $fO2$ (4 wt. % H_2O)	log ΔFQM (4 wt. % H_2O)	log $fO2$ (6 wt. % H_2O)	log ΔFQM (6 wt. % H_2O)	log $fO2$ (9 wt. % H_2O)	log ΔFQM (9 wt. % H_2O)
353369	7	RIM	Main Population	PS	3	0.00074	816	-15.14	-0.72	-14.32	0.09	-13.27	1.15
353369	8	RIM	Main Population	PS	28	0.00083	736	-16.60	-0.38	-15.79	0.44	-14.73	1.49
353369	9	RIM	Inherited	PS	37	0.00066	720	-17.35	-0.74	-16.53	0.08	-15.48	1.13
353369	10	RIM	Main Population	PS	108	0.00081	688	-17.77	-0.31	-16.95	0.51	-15.90	1.56
353369	11	RIM	Lead Loss	PS	46	0.00106	797	-14.89	-0.06	-14.07	0.75	-13.02	1.81
353369	11	CORE	Main Population	PS	8	0.00108	742	-16.00	0.08	-15.19	0.89	-14.13	1.95
353369	12	RIM	Main Population	PS	42	0.00071	703	-17.64	-0.58	-16.83	0.24	-15.77	1.29
353369	13	RIM	Inherited	PS	57	0.00090	715	-16.93	-0.19	-16.11	0.63	-15.06	1.68
353369	14	RIM	Inherited	PS	31	0.00080	729	-16.83	-0.43	-16.01	0.38	-14.95	1.44
353369	15	RIM	Main Population	PS	135	0.00106	688	-17.30	0.16	-16.48	0.98	-15.43	2.03
353369	16	RIM	Main Population	PS	37	0.00078	729	-16.85	-0.47	-16.03	0.35	-14.98	1.41
353369	17	RIM	Main Population	PS	94	0.00089	718	-16.88	-0.21	-16.06	0.60	-15.00	1.66
353369	18	RIM	Main Population	PS	34	0.00078	739	-16.62	-0.48	-15.80	0.34	-14.75	1.39
353369	19	RIM	Lead Loss	PS	38	0.00078	739	-16.63	-0.48	-15.81	0.34	-14.76	1.39
353369	20	RIM	Main Population	PS	40	0.00085	737	-16.53	-0.34	-15.72	0.48	-14.66	1.53
353369	21	RIM	Titanite/Apatite Inclusions	PS	-1		694						
353369	22	RIM	Main Population	PS	78	0.00091	716	-16.90	-0.17	-16.08	0.65	-15.03	1.70
353369	23	RIM	Main Population	PS	75	0.00099	684	-17.52	0.04	-16.70	0.86	-15.65	1.92
353369	24	RIM	Main Population	PS	86	0.00092	699	-17.27	-0.12	-16.45	0.70	-15.40	1.75
353369	25	RIM	Main Population	PS	113	0.00124	676	-17.31	0.46	-16.50	1.28	-15.44	2.33
353369	26	RIM	Main Population	PS	40	0.00071	727	-17.07	-0.63	-16.25	0.18	-15.19	1.24
353369	27	RIM	Inherited	PS	30	0.00093	735	-16.42	-0.18	-15.60	0.64	-14.54	1.69
353369	28	RIM	Main Population	PS	155	0.00096	702	-17.13	-0.04	-16.31	0.77	-15.26	1.83

Table A1. 6 continued: Zircon calculated variables Ce^{4+}/Ce^{3+} ratios, Ti in Zr temperatures, and oxygen fugacity. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles.

Sample	Grain	Sector	Observation	Area	Ce^{4+}/Ce^{3+} zircon	Ce^{4+}/Ce^{3+} melt	Ti-in-Zr Temperature (°C)	log $fO2$ (4 wt. % H_2O)	log ΔFQM (4 wt. % H_2O)	log $fO2$ (6 wt. % H_2O)	log ΔFQM (6 wt. % H_2O)	log $fO2$ (9 wt. % H_2O)	log ΔFQM (9 wt. % H_2O)
353369	29	RIM	Main Population	PS	26	0.00098	776	-15.44	-0.17	-14.63	0.65	-13.57	1.70
353369	30	RIM	Main Population	PS	43	0.00092	722	-16.73	-0.17	-15.92	0.65	-14.86	1.71
353369	31	RIM	Main Population	PS	105	0.00095	742	-16.24	-0.16	-15.42	0.66	-14.37	1.71
353369	32	RIM	Main Population	PS	195	0.00232	751	-14.48	1.38	-13.66	2.20	-12.60	3.25
353369	33	RIM	Main Population	PS	18	0.00100	761	-15.73	-0.11	-14.91	0.71	-13.86	1.77
353369	34	RIM	Main Population	PS	130	0.00081	703	-17.40	-0.34	-16.58	0.48	-15.53	1.53
353369	35	RIM	Main Population	PS	34	0.00074	713	-17.31	-0.51	-16.49	0.30	-15.44	1.36
353369	36	RIM	Inherited	PS	44	0.00132	773	-14.98	0.36	-14.17	1.18	-13.11	2.23
353369	37	RIM	Main Population	PS	21	0.00095	772	-15.58	-0.21	-14.76	0.61	-13.71	1.66
353369	38	RIM	Inherited	PS	36	0.00114	747	-15.80	0.15	-14.98	0.97	-13.93	2.02
353369	39	RIM	Titanite/Apatite Inclusions	PS	1	0.00120	794	-14.73	0.16	-13.91	0.98	-12.85	2.03
353369	40	RIM	Main Population	PS	49	0.00095	674	-17.83	0.00	-17.01	0.82	-15.96	1.87
353369	41	RIM	Main Population	PS	23	0.00107	743	-16.00	0.05	-15.18	0.87	-14.13	1.92
353369	42	RIM	Discordant	PS	17	0.00096	694	-17.33	-0.03	-16.51	0.79	-15.46	1.84
353369	43	RIM	Main Population	PS	24	0.00081	649	-18.76	-0.21	-17.95	0.61	-16.89	1.66
353369	44	RIM	Main Population	PS	68	0.00096	689	-17.45	-0.03	-16.63	0.79	-15.57	1.84
353369	45	RIM	Main Population	PS	71	0.00083	733	-16.64	-0.36	-15.83	0.46	-14.77	1.51
353369	46	RIM	Main Population	PS	38	0.00077	715	-17.19	-0.45	-16.38	0.36	-15.32	1.42
353369	47	RIM	Main Population	PS	40	0.00086	676	-17.97	-0.18	-17.16	0.63	-16.10	1.69
353369	48	RIM	Inherited	PS	46	0.00084	727	-16.78	-0.34	-15.96	0.47	-14.90	1.53
353369	49	RIM	Discordant	PS	33	0.00110	755	-15.68	0.09	-14.86	0.90	-13.81	1.96
353369	50	RIM	Discordant	PS	22	0.00089	771	-15.71	-0.32	-14.90	0.50	-13.84	1.55
353369	51	RIM	Main Population	PS	139	0.00198	749	-14.81	1.11	-13.99	1.93	-12.94	2.98

Table A1. 6 continued: Zircon calculated variables Ce^{4+}/Ce^{3+} ratios, Ti in Zr temperatures, and oxygen fugacity. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles.

Sample	Grain	Sector	Observation	Area	Ce^{4+}/Ce^{3+} zircon	Ce^{4+}/Ce^{3+} melt	Ti-in-Zr Temperature (°C)	log $fO2$ (4 wt. % H_2O)	log ΔFQM (4 wt. % H_2O)	log $fO2$ (6 wt. % H_2O)	log ΔFQM (6 wt. % H_2O)	log $fO2$ (9 wt. % H_2O)	log ΔFQM (9 wt. % H_2O)
353381	1	RIM	Discordant	UR	877	0.00166	689	-16.22	1.20	-15.41	2.01	-14.36	3.06
353381	2	RIM	Lead Loss	UR	426	0.00325	715	-14.45	2.31	-13.63	3.13	-12.58	4.18
353381	3	RIM	Lead Loss	UR	97	0.00233	762	-13.96	1.64	-13.15	2.45	-12.09	3.50
353381	4	RIM	Main Population	UR	12	0.00130	743	-15.39	0.65	-14.58	1.47	-13.53	2.52
353381	5	RIM	Main Population	UR	234	0.00159	675	-16.66	1.16	-15.85	1.97	-14.80	3.02
353381	6	RIM	Main Population	UR	198	0.00183	702	-15.74	1.34	-14.93	2.15	-13.88	3.20
353381	7	RIM	Inherited	UR	102	0.00123	669	-17.24	0.73	-16.43	1.55	-15.38	2.60
353381	8	RIM	Main Population	UR	45	0.00221	760	-14.11	1.55	-13.29	2.36	-12.24	3.41
353381	9	RIM	Titanite/Apatite Inclusions	UR	1	0.00211	729	-14.87	1.53	-14.06	2.35	-13.01	3.40
353381	10	CORE	Main Population	UR	11	0.00085	765	-15.64	-0.12	-14.82	0.70	-13.77	1.75
353381	10	RIM	Inherited	UR	761	0.00269	550	-19.39	2.43	-18.58	3.25	-17.53	4.30
353381	11	RIM	Inherited	UR	4	0.00036	797	-16.50	-1.68	-15.69	-0.87	-14.64	0.19
353381	12	RIM	Inherited	UR	24	0.00106	828	-14.01	0.15	-13.20	0.96	-12.15	2.02
353381	13	RIM	Titanite/Apatite Inclusions	UR	4380	0.00177							
353381	14	RIM	Main Population	UR	34	0.00179	835	-12.98	1.04	-12.17	1.86	-11.12	2.91
353381	15	RIM	Main Population	UR	115	0.00221	729	-14.79	1.61	-13.97	2.42	-12.92	3.47
353381	16	CORE	Inherited	UR	15	0.00164	731	-15.26	1.08	-14.45	1.90	-13.40	2.95
353381	16	RIM	Main Population	UR	299	0.00273	656	-16.20	2.14	-15.39	2.96	-14.33	4.01
353381	17	RIM	Inherited	UR	1	0.00112	777	-14.91	0.34	-14.09	1.15	-13.04	2.20
353381	18	RIM	Inherited	UR	148	0.00231	673	-16.05	1.81	-15.23	2.62	-14.18	3.67
353381	18	RIM	Main Population	UR	109	0.00242	680	-15.79	1.87	-14.98	2.69	-13.93	3.74
353381	19	RIM	Lead Loss	UR	687	0.00303	725	-14.32	2.17	-13.50	2.98	-12.45	4.03
353381	20	RIM	Inherited	UR	53	0.00187	743	-14.75	1.29	-13.94	2.11	-12.89	3.16

Table A1. 6 continued: Zircon calculated variables Ce^{4+}/Ce^{3+} ratios, Ti in Zr temperatures, and oxygen fugacity. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles.

Sample	Grain	Sector	Observation	Area	Ce^{4+}/Ce^{3+} zircon	Ce^{4+}/Ce^{3+} melt	Ti-in-Zr Temperature (°C)	log $fO2$ (4 wt. % H_2O)	log ΔFQM (4 wt. % H_2O)	log $fO2$ (6 wt. % H_2O)	log ΔFQM (6 wt. % H_2O)	log $fO2$ (9 wt. % H_2O)	log ΔFQM (9 wt. % H_2O)
353381	21	RIM	Main Population	UR	158	0.00203	724	-15.05	1.47	-14.24	2.29	-13.19	3.34
353381	23	RIM	Lead Loss	UR	58	0.00239	729	-14.66	1.75	-13.85	2.56	-12.79	3.61
353381	24	RIM	Main Population	UR	145	0.00225	761	-14.04	1.58	-13.23	2.39	-12.18	3.44
353381	25	RIM	Lead Loss	UR	163	0.00283	713	-14.71	2.07	-13.90	2.89	-12.85	3.94
353381	26	RIM	Lead Loss	UR	764	0.00325	687	-15.11	2.37	-14.30	3.18	-13.24	4.24
353381	27	RIM	Main Population	UR	26	0.00114	747	-15.53	0.42	-14.71	1.24	-13.66	2.29
353381	28	RIM	Main Population	UR	146	0.00211	722	-15.03	1.54	-14.21	2.35	-13.16	3.41
353381	29	RIM	Main Population	UR	20	0.00123	782	-14.67	0.49	-13.86	1.30	-12.81	2.35
353381	30	RIM	Lead Loss	UR	142	0.00187	719	-15.31	1.34	-14.50	2.15	-13.45	3.21
353381	31	RIM	Discordant	UR	42	0.00155	793	-14.04	0.87	-13.22	1.68	-12.17	2.73
353381	32	RIM	Lead Loss	UR	215	0.00138	692	-16.48	0.88	-15.67	1.69	-14.62	2.74
353381	33	RIM	Inherited	UR	300	0.00176	671	-16.59	1.34	-15.78	2.15	-14.72	3.21
353381	33	RIM	Main Population	UR	152	0.00229	725	-14.81	1.68	-13.99	2.49	-12.94	3.54
353381	34	RIM	Rejected	UR	52	0.00137	969	-11.22	0.38	-10.41	1.19	-9.36	2.24
353381	35	RIM	Main Population	UR	116	0.00214	708	-15.33	1.60	-14.51	2.41	-13.46	3.47
353381	36	RIM	Main Population	UR	1	0.00123	769	-14.93	0.51	-14.11	1.33	-13.06	2.38
353381	37	RIM	Discordant	UR	29	0.00153	813	-13.66	0.81	-12.85	1.62	-11.80	2.67
353381	38	RIM	Main Population	UR	323	0.00142	659	-17.28	1.00	-16.47	1.81	-15.41	2.86
353381	39	RIM	Inherited	UR	86	0.00151	729	-15.45	0.95	-14.64	1.77	-13.59	2.82
353381	40	RIM	Lead Loss	UR	254	0.00204	705	-15.48	1.52	-14.67	2.33	-13.61	3.38
353381	41	RIM	Main Population	UR	81	0.00270	767	-13.61	1.88	-12.80	2.70	-11.74	3.75
353381	42	RIM	Rejected	UR	-1		2126						
353381	42	RIM	Main Population	UR	504	0.00293	719	-14.53	2.12	-13.72	2.93	-12.67	3.99

Table A1. 6 continued: Zircon calculated variables Ce^{4+}/Ce^{3+} ratios, Ti in Zr temperatures, and oxygen fugacity. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles.

Sample	Grain	Sector	Observation	Area	Ce^{4+}/Ce^{3+} zircon	Ce^{4+}/Ce^{3+} melt	Ti-in-Zr Temperature (°C)	log $fO2$ (4 wt. % H_2O)	log ΔFQM (4 wt. % H_2O)	log $fO2$ (6 wt. % H_2O)	log ΔFQM (6 wt. % H_2O)	log $fO2$ (9 wt. % H_2O)	log ΔFQM (9 wt. % H_2O)
353381	43	RIM	Rejected	UR	364	0.00194	1086	-9.03	0.82	-8.21	1.64	-7.16	2.69
353381	44	RIM	Main Population	UR	56	0.00136	718	-15.89	0.79	-15.08	1.60	-14.03	2.65
353381	45	RIM	Discordant	UR	97	0.00193	772	-14.08	1.29	-13.26	2.10	-12.21	3.15
353381	46	RIM	Inherited	UR	111	0.00181	789	-13.84	1.14	-13.03	1.96	-11.98	3.01
353381	47	RIM	Main Population	UR	72	0.00191	770	-14.14	1.28	-13.32	2.09	-12.27	3.14
353381	48	RIM	Inherited	UR	222	0.00239	687	-15.64	1.84	-14.83	2.65	-13.78	3.71
353381	49	RIM	Lead Loss	UR	91	0.00172	736	-15.07	1.16	-14.26	1.97	-13.20	3.02
353384	1	RIM	Inherited	PB	1	0.00020	863	-16.05	-2.59	-15.23	-1.77	-14.17	-0.72
353384	2	RIM	Titanite/Apatite Inclusions	PB	1	0.00031	931	-14.22	-1.99	-13.40	-1.17	-12.35	-0.11
353384	3	RIM	Inherited	PB	9	0.00048	715	-17.58	-0.84	-16.76	-0.02	-15.71	1.03
353384	4	RIM	Main Population	PB	26	0.00182	867	-12.20	1.20	-11.38	2.02	-10.32	3.07
353384	5	RIM	Main Population	PB	1	0.00027	857	-15.65	-2.07	-14.83	-1.25	-13.77	-0.20
353384	6	RIM	Inherited	PB	49	0.00063	755	-16.21	-0.44	-15.39	0.37	-14.34	1.43
353384	7	RIM	Inherited	PB	1	0.00027	788	-16.97	-1.96	-16.15	-1.14	-15.09	-0.09
353384	8	RIM	Discordant	PB	13	0.00135	790	-14.15	0.81	-13.34	1.63	-12.28	2.69
353384	9	RIM	Inherited	PB	16	0.00077	745	-16.10	-0.08	-15.28	0.74	-14.22	1.79
353384	10	RIM	Lead Loss	PB	2	0.00052	841	-14.84	-0.94	-14.03	-0.12	-12.97	0.94
353384	11	RIM	Inherited	PB	9	0.00054	787	-15.80	-0.77	-14.98	0.05	-13.92	1.11
353384	12	RIM	Main Population	PB	5	0.00044	870	-14.60	-1.27	-13.79	-0.45	-12.73	0.61
353384	13	RIM	Discordant	PB	0	0.00002	861	-20.08	-6.57	-19.26	-5.75	-18.20	-4.69
353384	13	CORE	Main Population	PB	0	0.00008	857	-17.70	-4.11	-16.88	-3.29	-15.82	-2.24
353384	14	RIM	Discordant	PB	7	0.00047	842	-14.97	-1.10	-14.15	-0.28	-13.09	0.78
353384	15	RIM	Main Population	PB	1	0.00025	865	-15.67	-2.24	-14.85	-1.42	-13.79	-0.37

Table A1. 6 continued: Zircon calculated variables Ce^{4+}/Ce^{3+} ratios, Ti in Zr temperatures, and oxygen fugacity. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles.

Sample	Grain	Sector	Observation	Area	Ce^{4+}/Ce^{3+} zircon	Ce^{4+}/Ce^{3+} melt	Ti-in-Zr Temperature (°C)	log $fO2$ (4 wt. % H_2O)	log ΔFQM (4 wt. % H_2O)	log $fO2$ (6 wt. % H_2O)	log ΔFQM (6 wt. % H_2O)	log $fO2$ (9 wt. % H_2O)	log ΔFQM (9 wt. % H_2O)
353384	16	RIM	Main Population	PB	18	0.00062	847	-14.42	-0.65	-13.60	0.17	-12.54	1.23
353384	17	RIM	Lead Loss	PB	2	0.00029	854	-15.58	-1.95	-14.76	-1.13	-13.70	-0.07
353384	18	RIM	Inherited	PB	3	0.00043	810	-15.75	-1.21	-14.93	-0.39	-13.87	0.67
353384	19	RIM	Discordant	PB	4	0.00040	856	-15.01	-1.41	-14.19	-0.59	-13.13	0.46
353384	20	RIM	Inherited	PB	2	0.00040	750	-17.12	-1.24	-16.31	-0.42	-15.25	0.64
353385	1	RIM	Inherited	UR	18	0.00066	741	-15.73	0.38	-14.92	1.19	-13.86	2.25
353385	2	RIM	Main Population	UR	68	0.00125	868	-12.11	1.27	-11.29	2.08	-10.24	3.14
353385	3	RIM	Discordant	UR	16	0.00055	670	-17.75	0.21	-16.94	1.02	-15.88	2.08
353385	4	RIM	Inherited	UR	38	0.00070	724	-16.02	0.51	-15.20	1.32	-14.15	2.38
353385	5	RIM	Inherited	UR	3	0.00061	773	-15.16	0.18	-14.34	1.00	-13.29	2.05
353385	6	RIM	Inherited	UR	98	0.00082	781	-14.49	0.67	-13.67	1.49	-12.62	2.54
353385	7	RIM	Inherited	UR	2	0.00043	794	-15.36	-0.48	-14.54	0.34	-13.49	1.39
353385	8	RIM	Discordant	UR	8	0.00237	864	-11.07	2.38	-10.25	3.19	-9.20	4.25
353385	9	RIM	Inherited	UR	11	0.00119	769	-14.10	1.35	-13.28	2.17	-12.23	3.22
353385	10	RIM	Main Population	UR	16	0.00146	793	-13.24	1.66	-12.43	2.48	-11.37	3.53
353385	11	RIM	Inherited	UR	20	0.00062	718	-16.36	0.31	-15.54	1.12	-14.49	2.18
353385	12	RIM	Rejected	UR	0	0.00033	757	-16.55	-0.83	-15.74	-0.02	-14.68	1.04
353385	12	RIM	Inherited	UR	28	0.00056	690	-17.21	0.20	-16.39	1.01	-15.34	2.07
353385	13	RIM	Inherited	UR	17	0.00053	769	-15.50	-0.06	-14.69	0.75	-13.63	1.81
353385	14	RIM	Inherited	UR	2	0.00051	749	-16.00	-0.08	-15.19	0.73	-14.13	1.79
353385	15	RIM	Lead Loss	UR	17	0.00217	704	-14.51	2.52	-13.69	3.34	-12.64	4.39
353385	16	RIM	Inherited	UR	2	0.00037	738	-16.78	-0.60	-15.97	0.22	-14.91	1.27
353385	17	RIM	Inherited	UR	8	0.00046	722	-16.76	-0.19	-15.94	0.62	-14.89	1.68

Table A1. 6 continued: Zircon calculated variables Ce^{4+}/Ce^{3+} ratios, Ti in Zr temperatures, and oxygen fugacity. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles.

Sample	Grain	Sector	Observation	Area	Ce^{4+}/Ce^{3+} zircon	Ce^{4+}/Ce^{3+} melt	Ti-in-Zr Temperature (°C)	log $fO2$ (4 wt. % H_2O)	log ΔFQM (4 wt. % H_2O)	log $fO2$ (6 wt. % H_2O)	log ΔFQM (6 wt. % H_2O)	log $fO2$ (9 wt. % H_2O)	log ΔFQM (9 wt. % H_2O)
353385	18	RIM	Inherited	UR	86	0.00055	626	-18.92	0.34	-18.11	1.15	-17.05	2.21
353385	19	RIM	Inherited	UR	3	0.00050	773	-15.53	-0.18	-14.71	0.63	-13.66	1.69
353385	20	RIM	Main Population	UR	57	0.00109	771	-14.19	1.20	-13.38	2.01	-12.32	3.07
353385	21	RIM	Inherited	UR	15	0.00063	762	-15.34	0.27	-14.52	1.08	-13.47	2.14
353385	22	RIM	Main Population	UR	24	0.00216	854	-11.41	2.23	-10.59	3.05	-9.54	4.10
353385	23	RIM	Inherited	UR	11	0.00058	740	-15.95	0.16	-15.13	0.98	-14.08	2.03
353385	24	RIM	Main Population	UR	81	0.00130	718	-15.07	1.61	-14.25	2.42	-13.20	3.48
353385	25	RIM	Inherited	UR	2	0.00036	866	-14.31	-0.90	-13.49	-0.09	-12.44	0.97
353385	26	RIM	Inherited	UR	25	0.00052	665	-17.96	0.13	-17.15	0.94	-16.09	2.00
353385	27	CORE	Inherited	UR	8	0.00067	752	-15.44	0.39	-14.62	1.21	-13.57	2.26
353385	27	RIM	Inherited	UR	23	0.00070	730	-15.87	0.50	-15.06	1.31	-14.00	2.37
353385	28	RIM	Inherited	UR	4	0.00047	745	-16.20	-0.21	-15.38	0.61	-14.33	1.66
353385	29	RIM	Main Population	UR	58	0.00123	761	-14.21	1.42	-13.39	2.23	-12.34	3.29
353385	30	RIM	Main Population	UR	170	0.00123	715	-15.23	1.52	-14.42	2.33	-13.36	3.39
353385	30	CORE	Inherited	UR	16	0.00254	672	-15.02	2.87	-14.21	3.69	-13.15	4.74
353385	31	CORE	Inherited	UR	6	0.00054	732	-16.27	0.06	-15.45	0.88	-14.40	1.93
353385	31	RIM	Inherited	UR	5	0.00056	721	-16.45	0.14	-15.63	0.95	-14.58	2.01
353385	32	RIM	Rejected	UR	2	0.00086	778	-14.46	0.77	-13.64	1.59	-12.59	2.64
353385	33	RIM	Inherited	UR	14	0.00053	716	-16.65	0.06	-15.84	0.88	-14.78	1.93
353385	33	CORE	Lead Loss	UR	20	0.00059	722	-16.37	0.21	-15.55	1.03	-14.50	2.08
353385	34	RIM	Main Population	UR	9	0.00098	780	-14.21	1.00	-13.39	1.81	-12.34	2.87
353388	1	RIM	Main Population	PB	17	0.00082	778	-15.84	-0.60	-15.02	0.21	-13.97	1.26
353388	2	RIM	Main Population	PB	18	0.00080	808	-15.29	-0.70	-14.47	0.12	-13.42	1.17

Table A1. 6 continued: Zircon calculated variables Ce^{4+}/Ce^{3+} ratios, Ti in Zr temperatures, and oxygen fugacity. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles.

Sample	Grain	Sector	Observation	Area	Ce^{4+}/Ce^{3+} zircon	Ce^{4+}/Ce^{3+} melt	Ti-in-Zr Temperature (°C)	log $fO2$ (4 wt. % H_2O)	log ΔFQM (4 wt. % H_2O)	log $fO2$ (6 wt. % H_2O)	log ΔFQM (6 wt. % H_2O)	log $fO2$ (9 wt. % H_2O)	log ΔFQM (9 wt. % H_2O)
353388	3	RIM	Main Population	PB	4	0.00051	808	-16.05	-1.48	-15.23	-0.66	-14.18	0.39
353388	4	RIM	Main Population	PB	5	0.00053	786	-16.43	-1.37	-15.62	-0.56	-14.57	0.49
353388	5	RIM	Main Population	PB	13	0.00068	791	-15.88	-0.94	-15.07	-0.13	-14.02	0.93
353388	6	RIM	Inherited	PB	10	0.00056	812	-15.81	-1.31	-15.00	-0.50	-13.95	0.55
353388	7	RIM	Discordant	PB	17	0.00081	815	-15.12	-0.68	-14.30	0.14	-13.25	1.19
353388	8	RIM	Main Population	PB	12	0.00081	791	-15.59	-0.65	-14.77	0.17	-13.72	1.22
353388	9	RIM	Discordant	PB	23	0.00082	808	-15.22	-0.65	-14.40	0.17	-13.35	1.22
353388	10	RIM	Discordant	PB	16	0.00068	798	-15.74	-0.95	-14.93	-0.14	-13.88	0.91
353388	11	RIM	Main Population	PB	4	0.00054	798	-16.15	-1.36	-15.34	-0.55	-14.29	0.50
353388	12	RIM	Main Population	PB	0	0.00021	843	-16.90	-3.05	-16.09	-2.24	-15.04	-1.18
353388	13	RIM	Discordant	PB	2	0.00038	810	-16.51	-1.99	-15.70	-1.17	-14.65	-0.12
353388	14	RIM	Main Population	PB	4	0.00058	853	-14.98	-1.33	-14.16	-0.51	-13.11	0.54
353388	15	RIM	Main Population	PB	9	0.00083	800	-15.35	-0.60	-14.54	0.21	-13.49	1.26
353388	16	RIM	Main Population	PB	3	0.00052	802	-16.13	-1.42	-15.32	-0.61	-14.27	0.44
353388	17	RIM	Inherited	PB	2	0.00028	838	-16.55	-2.59	-15.74	-1.78	-14.69	-0.73
353388	19	RIM	Main Population	PB	6	0.00061	778	-16.35	-1.11	-15.54	-0.30	-14.49	0.75
353388	20	RIM	Main Population	PB	11	0.00063	822	-15.43	-1.14	-14.62	-0.33	-13.57	0.72
353388	21	RIM	Main Population	PB	1	0.00036	802	-16.79	-2.08	-15.98	-1.27	-14.93	-0.22
353388	22	RIM	Main Population	PB	7	0.00057	847	-15.10	-1.33	-14.29	-0.52	-13.24	0.53
353388	23	RIM	Main Population	PB	0	0.00016	844	-17.38	-3.55	-16.57	-2.73	-15.52	-1.68
353388	24	RIM	Main Population	PB	1	0.00040	779	-17.04	-1.83	-16.23	-1.02	-15.18	0.04
353388	25	RIM	Main Population	PB	20	0.00072	765	-16.32	-0.80	-15.51	0.01	-14.46	1.06
353388	26	RIM	Discordant	PB	3	0.00049	803	-16.22	-1.55	-15.41	-0.73	-14.36	0.32

Table A1. 6 continued: Zircon calculated variables Ce^{4+}/Ce^{3+} ratios, Ti in Zr temperatures, and oxygen fugacity. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles.

Sample	Grain	Sector	Observation	Area	Ce^{4+}/Ce^{3+} zircon	Ce^{4+}/Ce^{3+} melt	Ti-in-Zr Temperature (°C)	log $fO2$ (4 wt. % H_2O)	log ΔFQM (4 wt. % H_2O)	log $fO2$ (6 wt. % H_2O)	log ΔFQM (6 wt. % H_2O)	log $fO2$ (9 wt. % H_2O)	log ΔFQM (9 wt. % H_2O)
353388	27	RIM	Main Population	PB	25	0.00068	789	-15.93	-0.95	-15.12	-0.14	-14.07	0.91
353388	28	RIM	Discordant	PB	3	0.00057	822	-15.57	-1.29	-14.76	-0.48	-13.71	0.57
353388	29	RIM	Lead Loss	PB	8	0.00112	762	-15.62	-0.02	-14.80	0.79	-13.75	1.84
353388	30	RIM	Discordant	PB	5	0.00070	800	-15.67	-0.92	-14.86	-0.11	-13.81	0.94
353388	31	RIM	Main Population	PB	5	0.00059	768	-16.61	-1.16	-15.80	-0.34	-14.75	0.71
353388	32	RIM	Discordant	PB	2	0.00052	849	-15.26	-1.52	-14.44	-0.71	-13.39	0.34
353388	33	RIM	Main Population	PB	73	0.00089	760	-16.06	-0.41	-15.25	0.40	-14.20	1.45
353388	34	RIM	Main Population	PB	8	0.00057	830	-15.44	-1.32	-14.63	-0.51	-13.58	0.54
353388	35	RIM	Main Population	PB	5	0.00059	784	-16.28	-1.16	-15.46	-0.35	-14.41	0.70
353388	36	RIM	Main Population	PB	8	0.00079	823	-15.01	-0.75	-14.20	0.07	-13.15	1.12
353388	37	RIM	Lead Loss	PB	0		732						
353388	38	RIM	Main Population	PB	45	0.00080	774	-15.94	-0.63	-15.13	0.19	-14.08	1.24
353388	39	RIM	Main Population	PB	5	0.00056	790	-16.25	-1.28	-15.44	-0.47	-14.39	0.58
353388	40	RIM	Main Population	PB	19	0.00089	779	-15.68	-0.46	-14.87	0.36	-13.82	1.41
353388	41	RIM	Titanite/Apatite Inclusions	PB	-1		819						
353388	42	RIM	Rejected	PB	1	0.00048	806	-16.21	-1.59	-15.40	-0.78	-14.35	0.27
353388	43	RIM	Main Population	PB	27	0.00081	803	-15.35	-0.66	-14.54	0.15	-13.49	1.20
353388	44	RIM	Lead Loss	PB	22	0.00075	805	-15.44	-0.80	-14.62	0.01	-13.57	1.06
353388	45	RIM	Main Population	PB	33	0.00074	797	-15.60	-0.80	-14.79	0.02	-13.74	1.07
353388	46	RIM	Main Population	PB	38	0.00092	765	-15.91	-0.38	-15.10	0.44	-14.05	1.49
353388	47	RIM	Titanite/Apatite Inclusions	PB	-1		863						
353388	48	RIM	Main Population	PB	17	0.00078	786	-15.73	-0.69	-14.92	0.13	-13.87	1.18
353388	49	RIM	Main Population	PB	3	0.00055	819	-15.69	-1.35	-14.88	-0.54	-13.83	0.51

Table A1. 6 continued: Zircon calculated variables Ce^{4+}/Ce^{3+} ratios, Ti in Zr temperatures, and oxygen fugacity. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles.

Sample	Grain	Sector	Observation	Area	Ce^{4+}/Ce^{3+} zircon	Ce^{4+}/Ce^{3+} melt	Ti-in-Zr Temperature (°C)	log $fO2$ (4 wt. % H_2O)	log ΔFQM (4 wt. % H_2O)	log $fO2$ (6 wt. % H_2O)	log ΔFQM (6 wt. % H_2O)	log $fO2$ (9 wt. % H_2O)	log ΔFQM (9 wt. % H_2O)
353388	50	RIM	Inherited	PB	2	0.00047	782	-16.73	-1.58	-15.92	-0.76	-14.87	0.29
353390	1	RIM	Titanite/Apatite Inclusions	PB	-1		769						
353390	2	CORE	Inherited	PB	1	0.00042	753	-17.61	-1.80	-16.80	-0.99	-15.74	0.07
353390	2	RIM	Inherited	PB	89	0.00093	665	-18.30	-0.21	-17.49	0.60	-16.43	1.66
353390	3	RIM	Discordant	PB	35	0.00152	742	-15.61	0.47	-14.79	1.29	-13.74	2.34
353390	4	RIM	Main Population	PB	83	0.00170	797	-14.24	0.56	-13.43	1.38	-12.37	2.43
353390	5	RIM	Main Population	PB	9	0.00105	749	-16.09	-0.18	-15.28	0.64	-14.22	1.69
353390	6	RIM	Lead Loss	PB	106	0.00178	677	-16.85	0.90	-16.04	1.71	-14.98	2.76
353390	7	RIM	Lead Loss	PB	38	0.00110	714	-16.80	-0.03	-15.99	0.78	-14.93	1.83
353390	8	RIM	Main Population	PB	98	0.00190	717	-15.78	0.92	-14.96	1.73	-13.91	2.78
353390	9	RIM	Titanite/Apatite Inclusions	PB	3	0.00155	698	-16.57	0.60	-15.76	1.42	-14.71	2.47
353390	10	RIM	Main Population	PB	29	0.00071	754	-16.66	-0.87	-15.84	-0.06	-14.79	1.00
353390	11	RIM	Discordant	PB	9	0.00099	772	-15.69	-0.32	-14.88	0.49	-13.83	1.55
353390	12	RIM	Main Population	PB	17	0.00102	792	-15.24	-0.31	-14.42	0.51	-13.37	1.56
353390	13	CORE	Discordant	PB	7	0.00089	770	-15.92	-0.50	-15.10	0.31	-14.05	1.36
353390	13	RIM	Main Population	PB	184	0.00184	685	-16.60	0.93	-15.78	1.74	-14.73	2.79
353390	14	RIM	Lead Loss	PB	12	0.00079	783	-15.86	-0.73	-15.05	0.08	-14.00	1.14
353390	15	RIM	Main Population	PB	51	0.00110	746	-16.07	-0.09	-15.26	0.73	-14.20	1.78
353390	16	RIM	Main Population	PB	19	0.00098	796	-15.23	-0.38	-14.41	0.43	-13.36	1.48
353390	17	RIM	Discordant	PB	372	0.00196	704	-16.03	0.99	-15.22	1.81	-14.17	2.86
353390	18	RIM	Lead Loss	PB	198	0.00200	703	-16.01	1.04	-15.20	1.85	-14.15	2.91
353390	19	RIM	Main Population	PB	30	0.00100	776	-15.59	-0.31	-14.77	0.50	-13.72	1.55
353390	20	RIM	Main Population	PB	64	0.00161	740	-15.54	0.58	-14.73	1.40	-13.68	2.45

Table A1. 6 continued: Zircon calculated variables Ce^{4+}/Ce^{3+} ratios, Ti in Zr temperatures, and oxygen fugacity. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles.

Sample	Grain	Sector	Observation	Area	Ce^{4+}/Ce^{3+} zircon	Ce^{4+}/Ce^{3+} melt	Ti-in-Zr Temperature (°C)	log $fO2$ (4 wt. % H_2O)	log ΔFQM (4 wt. % H_2O)	log $fO2$ (6 wt. % H_2O)	log ΔFQM (6 wt. % H_2O)	log $fO2$ (9 wt. % H_2O)	log ΔFQM (9 wt. % H_2O)
353390	21	RIM	Main Population	PB	11	0.00094	808	-15.06	-0.48	-14.25	0.33	-13.20	1.38
353390	22	RIM	Main Population	PB	43	0.00104	745	-16.19	-0.19	-15.37	0.62	-14.32	1.67
353390	23	RIM	Main Population	PB	68	0.00150	749	-15.48	0.44	-14.66	1.26	-13.61	2.31
353390	24	RIM	Lead Loss	PB	1	0.00065	740	-17.10	-0.99	-16.29	-0.18	-15.24	0.88
353390	25	RIM	Main Population	PB	16	0.00096	764	-15.90	-0.36	-15.09	0.45	-14.04	1.51
353390	26	RIM	Inherited	PB	12	0.00098	778	-15.59	-0.35	-14.77	0.47	-13.72	1.52
353390	27	RIM	Lead Loss	PB	23	0.00084	747	-16.52	-0.57	-15.70	0.25	-14.65	1.30
353390	28	RIM	Main Population	PB	96	0.00173	662	-17.28	0.88	-16.47	1.70	-15.42	2.75
353390	29	RIM	Discordant	PB	169	0.00148	683	-17.03	0.55	-16.22	1.37	-15.16	2.42
353390	30	RIM	Main Population	PB	111	0.00139	690	-16.95	0.44	-16.14	1.25	-15.09	2.30
353390	31	RIM	Main Population	PB	5	0.00084	763	-16.18	-0.61	-15.36	0.21	-14.31	1.26
353390	32	RIM	Main Population	PB	74	0.00144	736	-15.82	0.39	-15.01	1.21	-13.96	2.26
353390	33	CORE	Main Population	PB	6	0.00093	790	-15.43	-0.46	-14.61	0.35	-13.56	1.41
353390	33	MID	Main Population	PB	9	0.00094	787	-15.47	-0.45	-14.66	0.37	-13.61	1.42
353390	33	RIM	Main Population	PB	107	0.00198	762	-14.70	0.90	-13.88	1.71	-12.83	2.77
353390	34	RIM	Main Population	PB	26	0.00136	746	-15.71	0.28	-14.89	1.10	-13.84	2.15
353390	35	RIM	Main Population	PB	61	0.00134	710	-16.56	0.32	-15.74	1.14	-14.69	2.19
353390	36	RIM	Discordant	PB	202	0.00167	710	-16.17	0.71	-15.36	1.52	-14.31	2.57
353390	37	RIM	Main Population	PB	101	0.00173	738	-15.47	0.71	-14.65	1.53	-13.60	2.58
353390	38	RIM	Lead Loss	PB	21	0.00134	729	-16.12	0.28	-15.30	1.10	-14.25	2.15
353390	39	RIM	Main Population	PB	17	0.00108	740	-16.23	-0.12	-15.42	0.69	-14.37	1.75
353390	40	CORE	Inherited	PB	3	0.00073	788	-15.91	-0.89	-15.10	-0.08	-14.04	0.97
353390	40	RIM	Main Population	PB	30	0.00108	770	-15.58	-0.17	-14.77	0.65	-13.72	1.70

Table A1. 6 continued: Zircon calculated variables Ce^{4+}/Ce^{3+} ratios, Ti in Zr temperatures, and oxygen fugacity. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles.

Sample	Grain	Sector	Observation	Area	Ce^{4+}/Ce^{3+} zircon	Ce^{4+}/Ce^{3+} melt	Ti-in-Zr Temperature (°C)	log *f*O2 (4 wt. % H_2O)	log ΔFQM (4 wt. % H_2O)	log *f*O2 (6 wt. % H_2O)	log ΔFQM (6 wt. % H_2O)	log *f*O2 (9 wt. % H_2O)	log ΔFQM (9 wt. % H_2O)
353390	41	RIM	Lead Loss	PB	15	0.00085	698	-17.63	-0.44	-16.82	0.37	-15.76	1.42
353390	42	RIM	Discordant	PB	26	0.00125	708	-16.71	0.21	-15.90	1.03	-14.85	2.08
353390	43	RIM	Main Population	PB	11	0.00109	761	-15.77	-0.14	-14.95	0.67	-13.90	1.73
353390	44	RIM	Inherited	PB	48	0.00083	689	-17.88	-0.46	-17.07	0.36	-16.02	1.41
353390	44	CORE	Inherited	PB	11	0.00110	778	-15.38	-0.15	-14.56	0.66	-13.51	1.72
353390	45	RIM	Inherited	PB	60	0.00144	684	-17.07	0.51	-16.25	1.32	-15.20	2.38
353390	46	RIM	Main Population	PB	234	0.00163	686	-16.79	0.72	-15.98	1.53	-14.92	2.58
353390	47	RIM	Main Population	PB	69	0.00092	724	-16.88	-0.36	-16.07	0.45	-15.01	1.51
353390	48	RIM	Discordant	PB	43	0.00099	727	-16.68	-0.25	-15.86	0.57	-14.81	1.62
353390	48	CORE	Main Population	PB	34	0.00104	771	-15.63	-0.23	-14.81	0.58	-13.76	1.63
353393	1	RIM	Main Population	TYC	332	0.00142	692	-17.12	0.22	-16.31	1.03	-15.26	2.08
353393	2	RIM	Main Population	TYC	176	0.00085	756	-16.54	-0.80	-15.73	0.01	-14.67	1.06
353393	3	RIM	Discordant	TYC	142	0.00067	677	-18.81	-1.06	-17.99	-0.25	-16.94	0.81
353393	4	RIM	Discordant	TYC	406	0.00143	660	-17.94	0.30	-17.12	1.12	-16.07	2.17
353393	5	RIM	Main Population	TYC	307	0.00099	640	-19.10	-0.28	-18.29	0.54	-17.23	1.59
353393	6	CORE	Inherited	TYC	285	0.00086	694	-17.96	-0.66	-17.15	0.15	-16.10	1.20
353393	6	RIM	Main Population	TYC	278	0.00086							
353393	7	RIM	Discordant	TYC	158	0.00092	679	-18.19	-0.50	-17.38	0.31	-16.33	1.37
353393	8	CORE	Main Population	TYC	120	0.00092	678	-18.22	-0.50	-17.41	0.32	-16.36	1.37
353393	8	RIM	Discordant	TYC	366	0.00100	694	-17.70	-0.40	-16.88	0.42	-15.83	1.47
353393	9	RIM	Lead Loss	TYC	828	0.00098	687	-17.90	-0.42	-17.09	0.40	-16.03	1.45
353393	10	RIM	Main Population	TYC	125	0.00126	625	-19.11	0.18	-18.29	1.00	-17.24	2.05
353393	11	RIM	Inherited	TYC	159	0.00041	776	-17.37	-2.10	-16.55	-1.28	-15.50	-0.23

Table A1. 6 continued: Zircon calculated variables Ce^{4+}/Ce^{3+} ratios, Ti in Zr temperatures, and oxygen fugacity. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles.

Sample	Grain	Sector	Observation	Area	Ce^{4+}/Ce^{3+} zircon	Ce^{4+}/Ce^{3+} melt	Ti-in-Zr Temperature (°C)	log *f*O2 (4 wt. % H_2O)	log ΔFQM (4 wt. % H_2O)	log *f*O2 (6 wt. % H_2O)	log ΔFQM (6 wt. % H_2O)	log *f*O2 (9 wt. % H_2O)	log ΔFQM (9 wt. % H_2O)
353393	12	RIM	Discordant	TYC	463	0.00144	675	-17.52	0.28	-16.71	1.10	-15.66	2.15
353393	13	RIM	Main Population	TYC	280	0.00107	656	-18.53	-0.18	-17.72	0.63	-16.67	1.68
353393	14	RIM	Main Population	TYC	589	0.00074	715	-17.70	-0.96	-16.89	-0.15	-15.84	0.90
353393	15	RIM	Inherited	TYC	166	0.00093	652	-18.88	-0.42	-18.06	0.39	-17.01	1.44
353393	16	RIM	Main Population	TYC	432	0.00097	631	-19.39	-0.29	-18.57	0.52	-17.52	1.58
353393	17	RIM	Lead Loss	TYC	24	0.00076	796	-15.92	-1.09	-15.11	-0.27	-14.06	0.78
353393	17	CORE	Lead Loss	TYC	8	0.00089	807	-15.41	-0.82	-14.60	0.00	-13.55	1.05
353393	18	RIM	Inherited	TYC	1092	0.00102							
353393	19	RIM	Main Population	TYC	551	0.00074	637	-19.70	-0.78	-18.89	0.04	-17.84	1.09
353393	20	RIM	Main Population	TYC	246	0.00075	630	-19.86	-0.74	-19.04	0.07	-17.99	1.12
353393	21	RIM	Main Population	TYC	483	0.00103	686	-17.84	-0.32	-17.02	0.49	-15.97	1.54
353393	22	RIM	Discordant	TYC	100	0.00101	698	-17.58	-0.40	-16.77	0.42	-15.72	1.47
353393	23	RIM	Main Population	TYC	641	0.00118	678	-17.82	-0.08	-17.00	0.74	-15.95	1.79
353393	24	RIM	Main Population	TYC	1722	0.00102	648	-18.84	-0.26	-18.02	0.56	-16.97	1.61
353393	25	RIM	Inherited	TYC	94	0.00067	760	-16.88	-1.23	-16.07	-0.41	-15.01	0.64
353393	26	RIM	Main Population	TYC	256	0.00082	680	-18.38	-0.72	-17.57	0.10	-16.52	1.15
353393	27	RIM	Main Population	TYC	88	0.00085	682	-18.28	-0.65	-17.47	0.16	-16.41	1.22
353393	28	RIM	Main Population	TYC	175	0.00134	768	-15.51	-0.04	-14.70	0.77	-13.64	1.82
353393	29	RIM	Main Population	TYC	161	0.00069	689	-18.44	-1.02	-17.63	-0.21	-16.58	0.84
353393	30	RIM	Inherited	TYC	72	0.00043	751	-17.85	-1.99	-17.03	-1.17	-15.98	-0.12
353393	31	RIM	Main Population	TYC	553	0.00071	649	-19.43	-0.89	-18.62	-0.08	-17.57	0.98
353393	31	CORE	Discordant	TYC	72	0.00103	653	-18.68	-0.26	-17.87	0.56	-16.81	1.61
353393	32	RIM	Inherited	TYC	22	0.00112	740	-16.41	-0.29	-15.60	0.52	-14.54	1.57

Table A1. 6 continued: Zircon calculated variables Ce^{4+}/Ce^{3+} ratios, Ti in Zr temperatures, and oxygen fugacity. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles.

Sample	Grain	Sector	Observation	Area	Ce^{4+}/Ce^{3+} zircon	Ce^{4+}/Ce^{3+} melt	Ti-in-Zr Temperature (°C)	log *f*O2 (4 wt. % H_2O)	log ΔFQM (4 wt. % H_2O)	log *f*O2 (6 wt. % H_2O)	log ΔFQM (6 wt. % H_2O)	log *f*O2 (9 wt. % H_2O)	log ΔFQM (9 wt. % H_2O)
353393	33	CORE	Main Population	TYC	777	0.00064							
353393	33	RIM	Main Population	TYC	580	0.00088	661	-18.76	-0.54	-17.94	0.27	-16.89	1.32
353393	34	RIM	Discordant	TYC	786	0.00137	700	-17.00	0.13	-16.19	0.95	-15.13	2.00
353393	35	RIM	Inherited	TYC	762	0.00085							
353393	36	RIM	Main Population	TYC	284	0.00090	627	-19.64	-0.42	-18.82	0.40	-17.77	1.45
353393	37	RIM	Main Population	TYC	387	0.00109	698	-17.45	-0.26	-16.63	0.56	-15.58	1.61
353393	38	RIM	Inherited	TYC	323	0.00090	706	-17.59	-0.61	-16.78	0.20	-15.72	1.25
353393	39	RIM	Main Population	TYC	1113	0.00100	667	-18.37	-0.33	-17.56	0.48	-16.51	1.53
353393	40	RIM	Main Population	TYC	855	0.00096	660	-18.63	-0.38	-17.81	0.43	-16.76	1.48
353393	41	CORE	Main Population	TYC	203	0.00095	646	-19.02	-0.37	-18.21	0.45	-17.16	1.50
353393	41	RIM	Main Population	TYC	416	0.00130	683	-17.51	0.09	-16.70	0.90	-15.65	1.96
353393	42	RIM	Main Population	TYC	765	0.00068	629	-20.07	-0.91	-19.26	-0.10	-18.21	0.96
353393	42	CORE	Inherited	TYC	1126	0.00076							
353393	43	RIM	Inherited	TYC	110	0.00083	630	-19.67	-0.56	-18.85	0.26	-17.80	1.31
353393	44	RIM	Inherited	TYC	434	0.00139	660	-17.99	0.25	-17.17	1.07	-16.12	2.12
353393	45	RIM	Main Population	TYC	416	0.00116	664	-18.19	-0.06	-17.38	0.75	-16.32	1.81
353393	46	RIM	Inherited	TYC	169	0.00121	638	-18.81	0.08	-18.00	0.89	-16.95	1.94
353393	46	CORE	Inherited	TYC	224	0.00129	683	-17.52	0.07	-16.71	0.88	-15.65	1.94
353393	47	RIM	Inherited	TYC	1001	0.00078	625	-19.93	-0.66	-19.12	0.15	-18.07	1.21
353393	47	CORE	Lead Loss	TYC	97	0.00154	722	-16.28	0.29	-15.46	1.10	-14.41	2.16
353393	48	CORE	Inherited	TYC	204	0.00068	638	-19.80	-0.92	-18.99	-0.11	-17.93	0.95
353393	48	RIM	Main Population	TYC	442	0.00089	654	-18.91	-0.51	-18.10	0.31	-17.05	1.36
353393	48	CORE	Main Population	TYC	659	0.00090							

Table A1. 6 continued: Zircon calculated variables Ce^{4+}/Ce^{3+} ratios, Ti in Zr temperatures, and oxygen fugacity. PB: Penacho Blanco, PS: Polo Sur, UR: Unrelated, TYC: Between Telegrafo and Caracoles.

Sample	Grain	Sector	Observation	Area	Ce^{4+}/Ce^{3+} zircon	Ce^{4+}/Ce^{3+} melt	Ti-in-Zr Temperature (°C)	log $fO2$ (4 wt. % H_2O)	log ΔFQM (4 wt. % H_2O)	log $fO2$ (6 wt. % H_2O)	log ΔFQM (6 wt. % H_2O)	log $fO2$ (9 wt. % H_2O)	log ΔFQM (9 wt. % H_2O)
353393	49	RIM	Discordant	TYC	973	0.00060							
353393	49	CORE	Discordant	TYC	160	0.00293	775	-13.99	1.30	-13.18	2.12	-12.12	3.17
353393	50	RIM	Lead Loss	TYC	238	0.00147	866	-13.45	-0.05	-12.64	0.77	-11.59	1.82
353393	50	CORE	Lead Loss	TYC	35	0.00173	1432	-6.52	-0.51	-5.71	0.30	-4.66	1.35
353393	51	RIM	Inherited	TYC	745	0.00094	654	-18.82	-0.40	-18.00	0.42	-16.95	1.47
353393	51	CORE	Main Population	TYC	131	0.00127	683	-17.54	0.05	-16.73	0.86	-15.68	1.91
353393	51	MID	Inherited	TYC	323	0.00143	695	-17.04	0.23	-16.22	1.04	-15.17	2.09
353393	52	MID	Main Population	TYC	428	0.00076	641	-19.55	-0.75	-18.73	0.07	-17.68	1.12
353393	52	CORE	Inherited	TYC	80	0.00086	726	-17.22	-0.74	-16.40	0.08	-15.35	1.13
353393	52	RIM	Discordant	TYC	357	0.00086	634	-19.51	-0.51	-18.69	0.31	-17.64	1.36
353393	53	RIM	Inherited	TYC	35	0.00057	738	-17.63	-1.46	-16.82	-0.64	-15.76	0.41
353393	54	RIM	Discordant	TYC	104	0.00103	875	-13.93	-0.69	-13.11	0.12	-12.06	1.18

Table A1. 7: Analysis for U-Pb ratios for R33 standard.

# Analysis	Age $^{206}Pb/^{238}U$ (Ma)		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
# 1	550.0	±93.0	0.640	±0.12	0.0920	±0.0180
# 2	449.6	±13.0	0.554	±0.05	0.0723	±0.0022
# 3	443.2	±11.0	0.535	±0.04	0.0712	±0.0018
# 4	436.1	±11.0	0.527	±0.04	0.0700	±0.0019
# 5	433.1	±8.8	0.509	±0.03	0.0695	±0.0015
# 6	431.8	±16.0	0.557	±0.05	0.0693	±0.0026
# 7	431.5	±11.0	0.531	±0.04	0.0692	±0.0018
# 8	431.2	±12.0	0.528	±0.05	0.0692	±0.0020
# 9	431.0	±16.0	0.524	±0.04	0.0692	±0.0027
# 10	430.7	±12.0	0.462	±0.04	0.0691	±0.0019
# 11	430.3	±11.0	0.518	±0.03	0.0690	±0.0019
# 12	430.2	±11.0	0.534	±0.04	0.0690	±0.0018
# 13	430.1	±15.0	0.501	±0.03	0.0690	±0.0025
# 14	430.0	±8.2	0.512	±0.02	0.0690	±0.0014
# 15	429.2	±8.4	0.549	±0.03	0.0689	±0.0014
# 16	429.0	±11.0	0.532	±0.03	0.0688	±0.0019
# 17	428.6	±11.0	0.574	±0.04	0.0688	±0.0017
# 18	428.6	±11.0	0.546	±0.04	0.0688	±0.0017
# 19	428.3	±12.0	0.531	±0.04	0.0687	±0.0020
# 20	428.2	±16.0	0.538	±0.05	0.0687	±0.0027
# 21	428.0	±8.5	0.555	±0.02	0.0687	±0.0014
# 22	427.3	±11.0	0.477	±0.04	0.0685	±0.0018
# 23	427.2	±9.6	0.537	±0.04	0.0685	±0.0016
# 24	426.7	±10.0	0.457	±0.04	0.0684	±0.0017
# 25	426.6	±9.1	0.531	±0.03	0.0684	±0.0015
# 26	426.2	±12.0	0.508	±0.04	0.0684	±0.0020
# 27	425.7	±16.0	0.525	±0.04	0.0683	±0.0026
# 28	425.6	±11.0	0.499	±0.03	0.0683	±0.0019
# 29	425.5	±8.0	0.516	±0.02	0.0682	±0.0013
# 30	425.3	±8.2	0.479	±0.02	0.0682	±0.0014
# 31	424.1	±12.0	0.502	±0.04	0.0680	±0.0019
# 32	424.1	±10.0	0.519	±0.03	0.0680	±0.0017
# 33	424.0	±16.0	0.524	±0.04	0.0680	±0.0026
# 34	423.8	±7.8	0.528	±0.03	0.0680	±0.0013
# 35	423.7	±15.0	0.520	±0.03	0.0680	±0.0025
# 36	423.5	±15.0	0.494	±0.03	0.0679	±0.0025
# 37	423.4	±11.0	0.513	±0.03	0.0679	±0.0018
# 38	423.0	±16.0	0.501	±0.04	0.0678	±0.0026
# 39	422.9	±12.0	0.514	±0.04	0.0678	±0.0021
# 40	422.7	±10.0	0.522	±0.02	0.0678	±0.0017
# 41	422.3	±11.0	0.516	±0.04	0.0677	±0.0019
# 42	422.2	±11.0	0.513	±0.03	0.0677	±0.0018

Table A1. 7 continued: Analysis for U-Pb ratios for R33 standard.

# Analysis	Age $^{206}Pb/^{238}U$ (Ma)		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
# 43	422.0	±16.0	0.507	±0.06	0.0677	±0.0027
# 44	421.9	±10.0	0.524	±0.04	0.0676	±0.0017
# 45	421.8	±16.0	0.512	±0.04	0.0676	±0.0026
# 46	421.5	±11.0	0.516	±0.04	0.0676	±0.0019
# 47	421.1	±15.0	0.525	±0.03	0.0675	±0.0025
# 48	420.8	±11.0	0.514	±0.03	0.0675	±0.0018
# 49	420.4	±9.6	0.687	±0.04	0.0674	±0.0016
# 50	420.4	±12.0	0.512	±0.04	0.0674	±0.0020
# 51	420.4	±15.0	0.543	±0.03	0.0674	±0.0024
# 52	420.3	±10.0	0.494	±0.04	0.0674	±0.0017
# 53	420.2	±15.0	0.536	±0.04	0.0674	±0.0025
# 54	420.2	±10.0	0.529	±0.03	0.0674	±0.0017
# 55	420.1	±11.0	0.497	±0.04	0.0673	±0.0018
# 56	419.9	±12.0	0.488	±0.04	0.0673	±0.0019
# 57	419.5	±13.0	0.470	±0.04	0.0673	±0.0022
# 58	419.5	±15.0	0.473	±0.03	0.0673	±0.0025
# 59	419.4	±9.6	0.544	±0.04	0.0672	±0.0016
# 60	419.3	±8.0	0.528	±0.02	0.0672	±0.0013
# 61	419.1	±11.0	0.522	±0.03	0.0672	±0.0018
# 62	418.6	±15.0	0.506	±0.03	0.0671	±0.0025
# 63	418.0	±15.0	0.519	±0.03	0.0670	±0.0025
# 64	417.9	±12.0	0.524	±0.05	0.0670	±0.0020
# 65	417.4	±11.0	0.499	±0.03	0.0669	±0.0019
# 66	416.2	±13.0	0.505	±0.06	0.0667	±0.0021
# 67	416.2	±15.0	0.507	±0.04	0.0667	±0.0024
# 68	415.7	±16.0	0.486	±0.04	0.0666	±0.0027
# 69	415.6	±10.0	0.531	±0.04	0.0666	±0.0017
# 70	415.5	±15.0	0.513	±0.04	0.0666	±0.0025
# 71	415.3	±15.0	0.490	±0.03	0.0666	±0.0024
# 72	415.3	±11.0	0.482	±0.03	0.0666	±0.0018
# 73	415.2	±7.9	0.537	±0.03	0.0665	±0.0013
# 74	414.7	±16.0	0.526	±0.04	0.0665	±0.0026
# 75	414.0	±10.0	0.485	±0.03	0.0663	±0.0017
# 76	413.4	±11.0	0.554	±0.03	0.0663	±0.0018
# 77	413.1	±11.0	0.508	±0.03	0.0662	±0.0018
# 78	412.5	±16.0	0.496	±0.04	0.0661	±0.0026
# 79	412.5	±14.0	0.524	±0.03	0.0661	±0.0024
# 80	412.3	±12.0	0.473	±0.05	0.0661	±0.0020
# 81	412.3	±10.0	0.492	±0.02	0.0661	±0.0017
# 82	412.2	±15.0	0.502	±0.04	0.0660	±0.0025
# 83	411.8	±11.0	0.494	±0.04	0.0660	±0.0019
# 84	411.5	±9.7	0.519	±0.04	0.0659	±0.0016

Table A1. 7 continued: Analysis for U-Pb ratios for R33 standard.

# Analysis	Age $^{206}Pb/^{238}U$ (Ma)		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
# 85	411.1	±7.8	0.503	±0.03	0.0659	±0.0013
# 86	410.7	±7.8	0.477	±0.02	0.0658	±0.0013
# 87	410.5	±15.0	0.525	±0.04	0.0658	±0.0025
# 88	410.1	±10.0	0.479	±0.03	0.0657	±0.0017
# 89	409.9	±10.0	0.503	±0.02	0.0657	±0.0016
# 90	409.8	±12.0	0.519	±0.05	0.0657	±0.0020
# 91	409.6	±9.6	0.537	±0.04	0.0656	±0.0016
# 92	408.6	±11.0	0.502	±0.02	0.0654	±0.0018
# 93	408.1	±11.0	0.475	±0.03	0.0654	±0.0018
# 94	407.4	±7.5	0.512	±0.03	0.0652	±0.0012
# 95	406.8	±14.0	0.492	±0.03	0.0651	±0.0024
# 96	404.3	±12.0	0.480	±0.04	0.0647	±0.0019
# 97	404.0	±9.9	0.497	±0.04	0.0646	±0.0017
# 98	402.3	±11.0	0.490	±0.04	0.0644	±0.0018

Appendix A2: Whole rock major and trace element geochemistry.

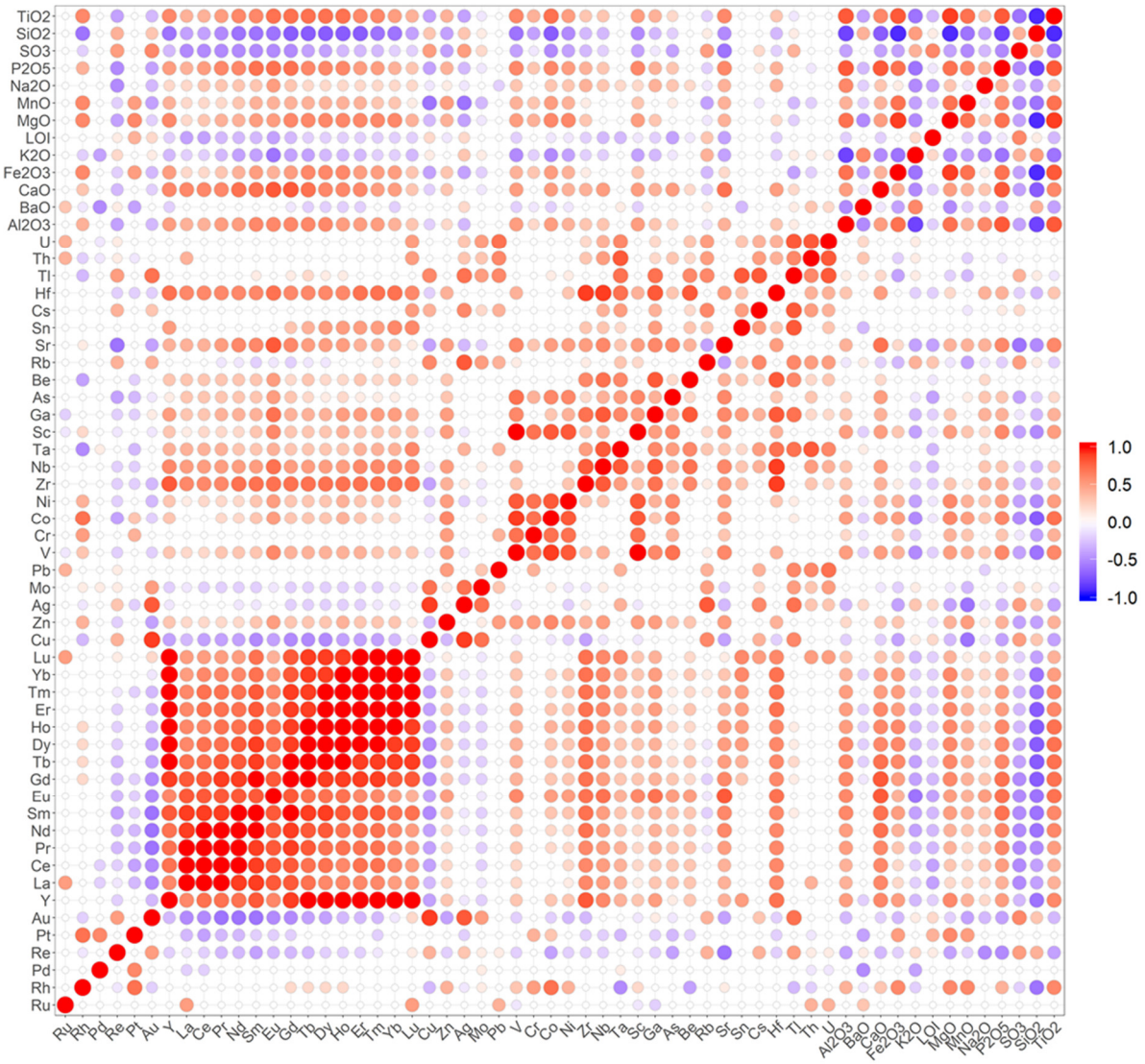

Figure A2. 1: Correlogram for the whole set of data of this study. Spearman correlation coefficients are calculated pairwise (calculated from complete pairs of data) between major and trace element data. Trace elements were used as the logarithm of the concentration. The correlation coefficient is graphically represented as blue for negative correlation, white as no correlation and red as positive correlation. The size of the circles scales symmetrically from zero.

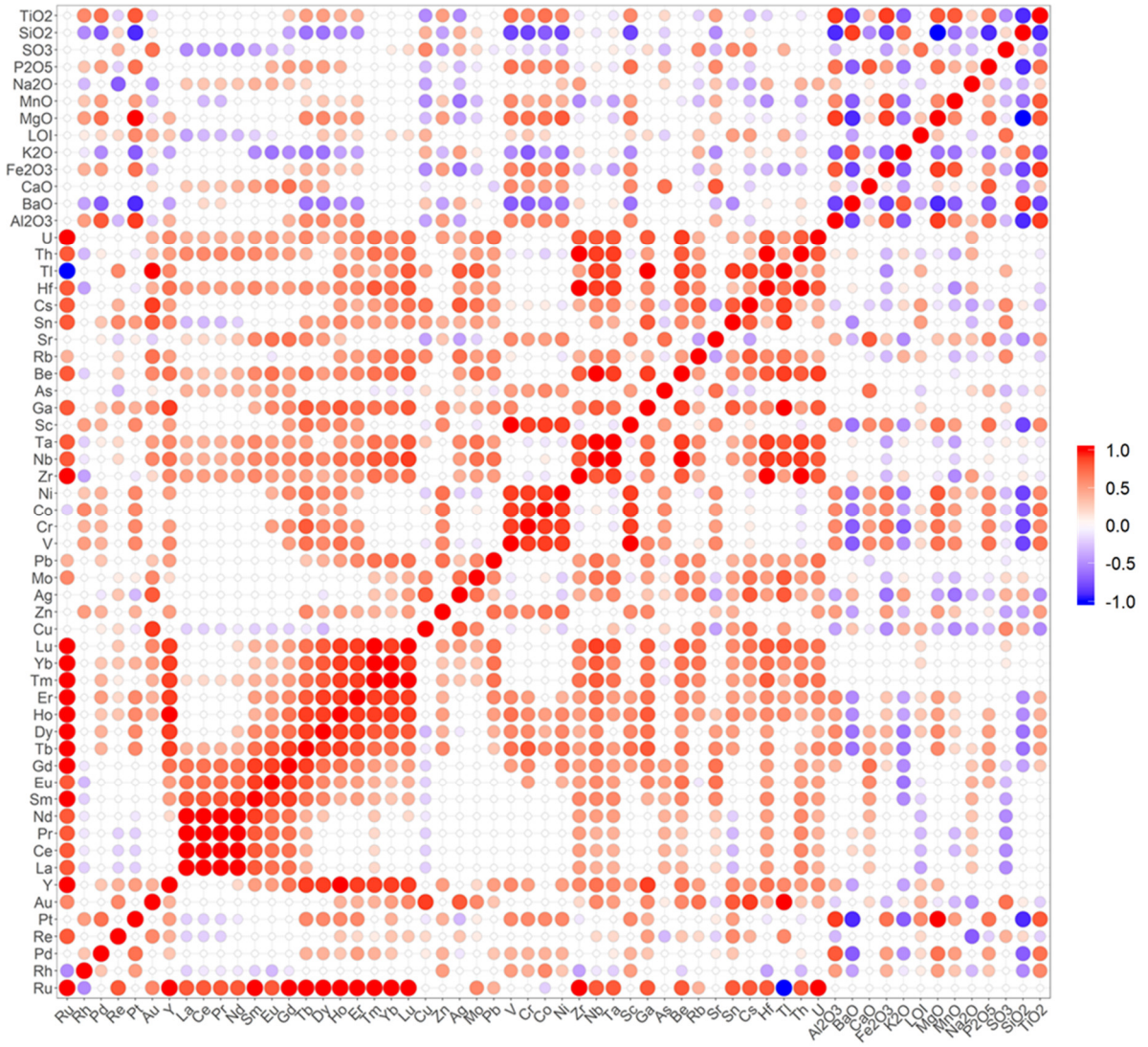

Figure A2. 2: Correlogram for samples from Penacho Blanco deposit. Spearman correlation coefficients are calculated pairwise (calculated from complete pairs of data) between major and trace element data. Trace elements were used as the logarithm of the concentration. The correlation coefficient is graphically represented as blue for negative correlation, white as no correlation and red as positive correlation. The size of the circles scales symmetrically from zero.

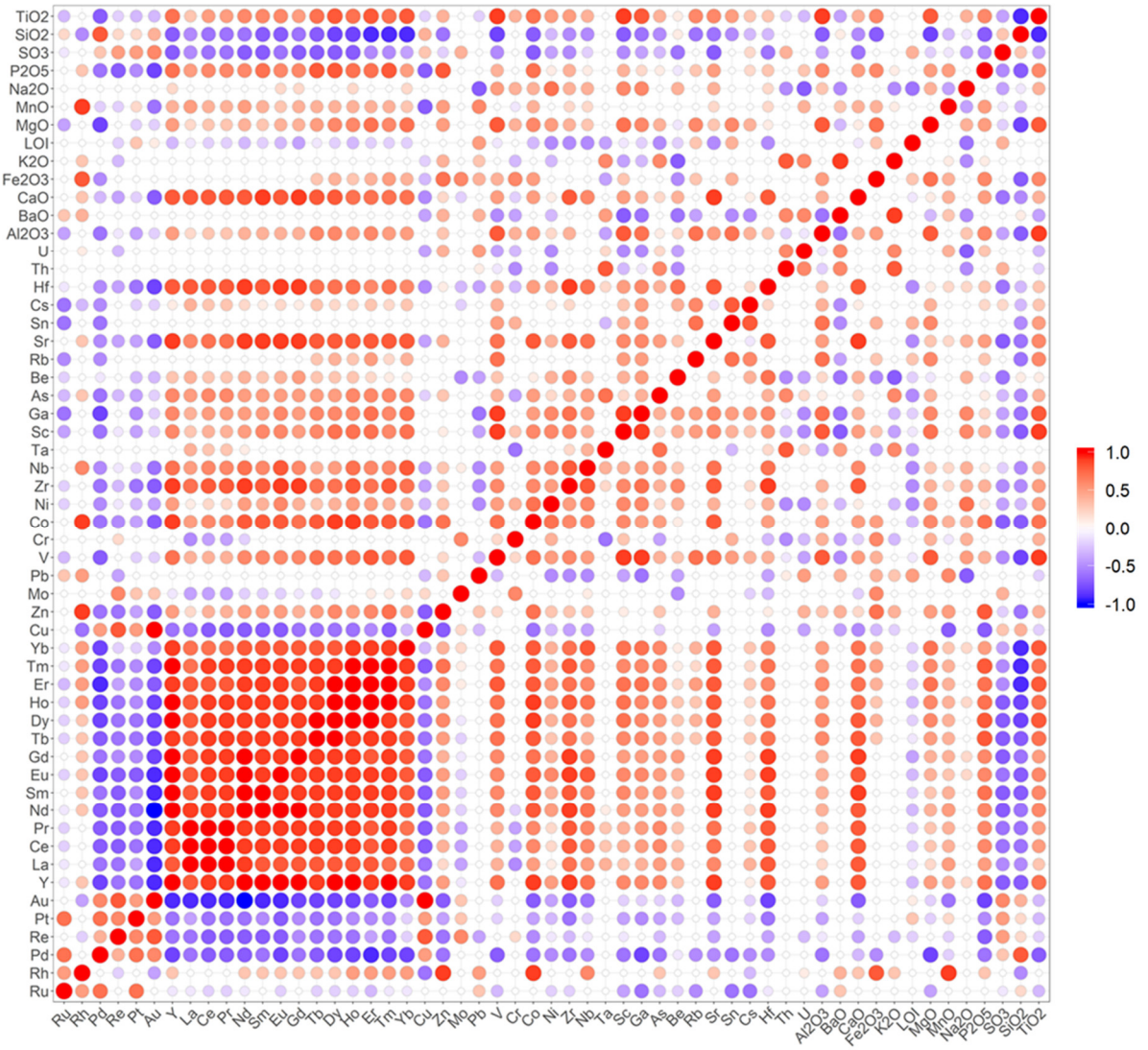

Figure A2. 3: Correlogram for samples from Penacho Blanco deposit. Spearman correlation coefficients are calculated pairwise (calculated from complete pairs of data) between major and trace element data. Trace elements were used as the logarithm of the concentration. The correlation coefficient is graphically represented as blue for negative correlation, white as no correlation and red as positive correlation. The size of the circles scales symmetrically from zero.

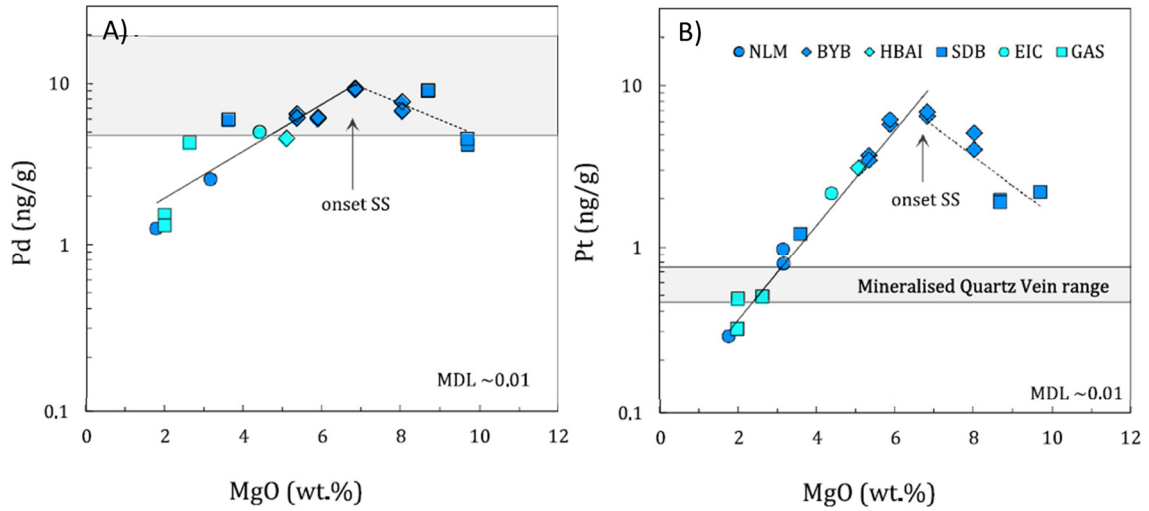

Figure A2. 4: Pd (A) and Pt (B) versus MgO data from Forest Reef Volcanic (Cadia). Modified from Lowczak et al. 2018. For more information refer to the original paper. Dark blue symbols = volcanics; light blue symbols = intrusive rocks. BYB = Burnt Yards Basalt; EIC = Errowan Intrusive Complex; GAS = Glen Ayre Syenite; HBAI = Hornblende Basalt Andesite Intrusive; NLM = Nullawonga Latite Member; SDB = Sundew Basalt.

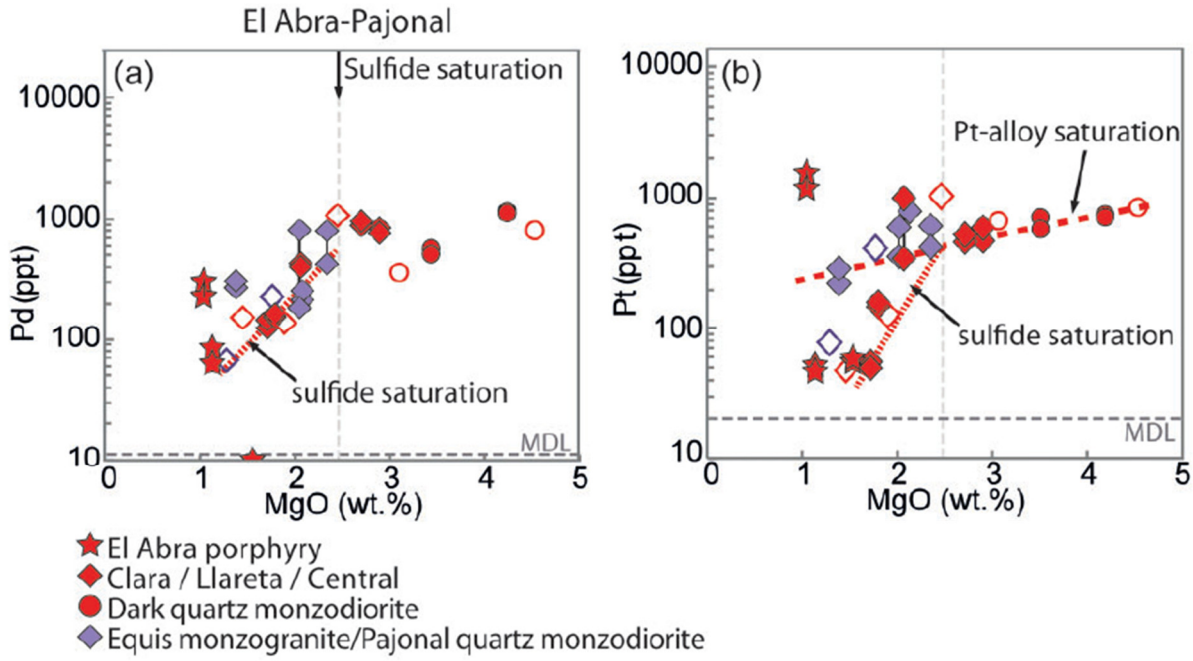

Figure A2. 5: Pd (A) and Pt (B) versus MgO data from El Abra-Pajonal Series. Modified from Cocker et al. 2015. For more information refer to the original paper. Red symbols are intrusions younger than 41 Ma and are related to amphibole-dominant fractionation. Star symbols indicate samples from the El Abra porphyry, which is associated with Cu mineralization. Circles are samples from the Dark quartz monzodiorite. Light purple symbols indicate intrusions older than 41 Ma, which are related to plagioclase-dominant fractionation. Open symbols show samples that were not analysed in duplicate. Dashed lines show Pt trends prior to sulfide saturation; dotted lines show Pd and Pt trends after sulfide saturation. Continuous vertical lines link duplicate samples. MDL, method detection limit.

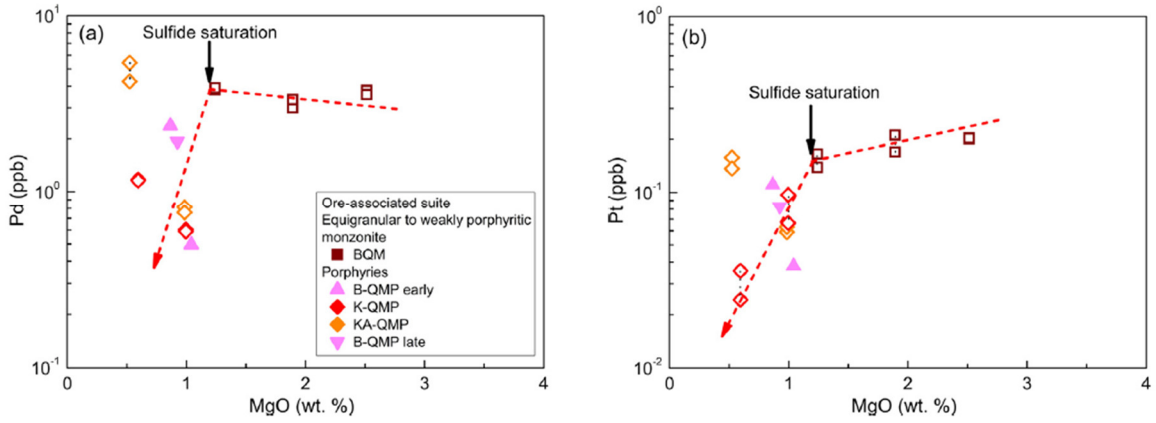

Figure A2. 6: Pd (A) and Pt (B) versus MgO data from Northparkes. Modified from Hao et al. 2019. For more information refer to the original paper. Open symbols are duplicate samples. The continuous short dashed lines with arrows are trend lines. The solid arrow represents the timing of sulfide saturation. Vertical dotted lines link duplicate analyses. BQM: Weakly mineralized biotite-quartz monzonite. B-QMP early: Early mineralized biotite quartz monzonite porphyry. K-QMP: Synmineralization K-feldspar-phyric quartz monzonite porphyry. KA-QMP: Late-mineralization augite-biotite-K-feldspar quartz monzonite porphyry. B-QMP late: Late-mineralization of a second phase of B-QMP.

Table A2. 1: XRF limits of Detection.

Elements	Units	Detection Limit
Al2O3	wt. %	0.01
BaO	wt. %	0.01
CaO	wt. %	0.01
Cr2O3	wt. %	0.01
Fe2O3	wt. %	0.01
K2O	wt. %	0.01
LOI	wt. %	0.01
MgO	wt. %	0.01
MnO	wt. %	0.01
Na2O	wt. %	0.01
P2O5	wt. %	0.002
SO3	wt. %	0.01
SiO2	wt. %	0.01
TiO2	wt. %	0.01

Table A2. 2: Major element abundances for Samples of Centinela District.

Sample	Al2O3 (wt. %)	BaO (wt. %)	CaO (wt. %)	Cr2O3 (wt. %)	Fe2O3 (wt. %)	K2O (wt. %)	LOI (wt. %)	MgO (wt. %)	MnO (wt. %)	Na2O (wt. %)	P2O5 (wt. %)	SO3 (wt. %)	SiO2 (wt. %)	TiO2 (wt. %)	Total (wt. %)
353362	15.23	0.09	2.12	b.l.d.	2.97	3.32	1.3	1.35	0.03	3.9	0.099	0.45	69.03	0.34	100.16
353363	16.99	0.08	4.46	b.l.d.	4.8	1.76	1.58	1.75	0.04	4.21	0.182	0.26	63.36	0.53	99.89
353364	17	0.09	3.88	b.l.d.	4.33	2.22	1.05	2.01	0.07	4.26	0.18	b.l.d.	64.37	0.51	100.11
353367	17.69	0.05	3.83	b.l.d.	4.85	1.48	1.78	2.34	0.04	4.31	0.187	0.1	62.85	0.62	100.22
353367*	17.73	0.05	3.86	b.l.d.	4.84	1.47	1.7	2.35	0.04	4.31	0.187	0.1	63.06	0.62	100.4
353368	17.45	0.05	4.07	b.l.d.	3.79	1.33	1.1	1.86	0.03	4.37	0.179	0.21	64.87	0.52	99.87
353369	17.25	0.05	3.44	b.l.d.	4.85	1.98	1.49	2.47	0.03	4.34	0.146	0.6	62.73	0.56	99.82
353370	16.17	0.05	3.83	b.l.d.	4.09	1.45	3.72	1.37	0.07	3.63	0.156	0.37	65.19	0.44	100.32
353371	15.47	0.06	3.24	b.l.d.	4.56	1.41	1.11	1.77	0.05	4.42	0.137	0.24	67.12	0.46	100
353372	17.26	0.09	4.76	b.l.d.	4.97	2.25	1.19	2.15	0.21	4.16	0.212	0.11	62.06	0.55	100.07
353386	16.81	0.08	5.08	b.l.d.	5.36	2.37	1.32	2.67	0.1	4.13	0.175	0.26	61.38	0.6	100.26
353452	15.63	0.07	3.46	b.l.d.	3.81	3.29	0.33	1.72	0.05	4.31	0.136	0.02	66.58	0.51	100.17
353453	15.74	0.08	3.8	b.l.d.	3.61	2.97	0.23	1.84	0.04	4.54	0.144	b.l.d.	66.29	0.55	100.09
353454	17.7	0.05	3.85	b.l.d.	5.47	1.95	0.82	1.89	0.03	4.75	0.222	0.07	62.34	0.69	99.96
353455	18.02	0.04	3.49	b.l.d.	5.75	2.22	1.82	2.3	0.02	4.34	0.26	0.45	60.74	0.78	100.08
353457	18.4	0.03	4.05	b.l.d.	6.33	2.14	0.95	2.77	0.02	4.63	0.254	0.4	59.26	0.93	100.1
353458	16.29	0.09	1.56	b.l.d.	4.53	4.41	1.73	1.37	0.04	4.23	0.147	0.03	65.13	0.48	100.13
353459	18.04	0.04	3.09	b.l.d.	7.99	2.31	1.69	2.83	0.05	4.67	0.246	0.19	57.98	0.85	100.03
353461	15.45	0.07	2.84	b.l.d.	2.28	3.55	2.58	1.85	0.02	4.71	0.14	2.21	65.14	0.53	99.76
353465	17.38	0.04	4.22	b.l.d.	4.93	1.9	1.17	2.23	0.02	5.02	0.218	0.9	61.71	0.72	99.88
353466	15.83	0.06	2.16	b.l.d.	4.23	3.02	1	1.81	0.02	4.45	0.139	0.09	66.6	0.53	100.02
353471	15.63	0.07	0.58	b.l.d.	3.32	4.54	1.76	1.9	0.08	4.43	0.131	0.45	66.67	0.5	99.95
Standards															
SY-4	20.7	0.05	8.03	b.l.d.	6.24	1.69		0.57	0.11	7.11	0.131	0.04	49.89	0.29	100.33
GIOP-120	0.03	b.l.d.	3.6	0.03	4.07	b.l.d.		5.5	0.02	0.05	0.296	0.01	85.57	b.l.d.	99.89

b.l.d.: Below limits of detection

* laboratory internal duplicate sample

Table A2. 3: Trace Element Standard values for LA-ICP-MS sessions. Values are in ppm. Uncertainties are at 2σ level.

Standard	Session	#	9 Be		45 Sc		51 V		53 Cr		59Co		60 Ni		65 Cu		66 Zn		71 Ga	
BCR2G	1	#1	2.24	±0.14	31.85	±0.56	399.50	±5.00	14.96	±0.45	35.62	±0.57	13.13	±0.74	16.35	±0.46	153.60	±2.60	21.67	±0.38
BCR2G	1	#2	2.33	±0.14	31.67	±0.50	401.90	±6.70	14.58	±0.44	36.15	±0.68	13.40	±1.20	17.93	±0.83	152.40	±3.10	21.70	±0.54
BCR2G	1	#3	2.51	±0.14	31.32	±0.61	395.70	±6.40	14.49	±0.67	35.50	±0.71	14.60	±2.00	16.88	±0.60	152.00	±3.10	21.26	±0.61
BCR2G	1	#4	2.41	±0.14	30.60	±1.40	404.00	±11.00	15.02	±0.72	37.10	±0.87	13.20	±1.50	17.10	±1.10	143.80	±4.80	22.50	±0.71
BCR2G	2	#5	2.22	±0.14	31.12	±0.56	395.70	±6.30	13.77	±0.41	35.72	±0.67	15.20	±1.00	17.81	±0.59	155.10	±3.00	21.75	±0.43
BCR2G	3	#6	2.36	±0.14	31.19	±0.44	379.50	±6.30	14.95	±0.56	34.93	±0.64	15.30	±1.80	18.90	±1.30	158.00	±4.90	20.61	±0.50
BCR2G	4	#7	2.50	±0.14	31.26	±0.51	392.50	±6.20	13.89	±0.48	35.51	±0.56	12.02	±0.57	18.40	±1.90	153.90	±3.30	21.19	±0.45
BCR2G	4	#8	2.05	±0.14	31.23	±0.49	397.00	±7.20	14.09	±0.51	35.68	±0.60	12.55	±0.56	16.59	±0.41	154.70	±3.50	21.37	±0.48
Average			2.33		31.28		395.73		14.47		35.78		13.68		17.50		152.94		21.51	
STD			0.15		0.37		7.52		0.50		0.63		1.22		0.91		4.13		0.55	
NIST610	1	#1	466.90	±7.00	441.90	±6.20	440.90	±5.30	405.10	±5.50	404.90	±5.40	458.90	±6.10	431.20	±6.20	455.80	±6.70	438.10	±6.80
NIST610	1	#2	466.30	±7.50	438.50	±5.40	441.70	±5.10	406.40	±5.50	404.50	±5.00	458.70	±6.60	427.10	±6.20	455.60	±5.80	438.10	±5.60
NIST610	1	#3	466.20	±8.30	445.60	±6.30	447.10	±6.80	404.40	±5.40	406.80	±6.40	461.30	±6.90	436.10	±8.10	458.10	±7.70	439.60	±7.50
NIST610	1	#4	466.10	±6.60	441.30	±5.10	439.70	±5.30	405.10	±5.30	404.40	±4.80	456.80	±6.40	427.70	±6.60	455.10	±6.80	437.30	±5.70
NIST610	1	#5	462.80	±7.40	441.30	±5.10	443.50	±5.60	404.60	±5.30	404.60	±5.30	457.10	±6.60	427.10	±6.40	456.10	±6.20	437.80	±6.10
NIST610	1	#6	468.30	±7.20	444.50	±6.10	442.30	±5.70	405.70	±6.00	406.30	±5.50	460.50	±6.40	432.70	±7.60	456.70	±6.50	438.10	±6.30
NIST610	1	#7	467.50	±7.00	441.70	±5.90	443.60	±5.30	405.00	±6.20	404.50	±5.70	459.90	±6.80	431.50	±6.30	455.10	±7.40	438.50	±5.50
NIST610	1	#8	463.50	±7.60	436.20	±5.30	437.30	±5.90	404.30	±6.90	403.70	±5.80	456.20	±7.70	428.20	±7.20	456.20	±6.80	436.20	±7.90
NIST610	1	#9	466.40	±6.70	440.70	±5.20	444.50	±5.80	405.10	±5.20	406.10	±5.30	458.10	±6.30	428.90	±5.90	455.80	±5.40	438.50	±6.20
NIST610	2	#10	467.50	±8.00	445.70	±6.00	444.90	±5.50	406.00	±5.00	405.00	±5.00	461.40	±5.90	429.10	±6.00	456.00	±6.30	438.30	±6.90
NIST610	2	#11	465.00	±8.40	436.10	±6.80	439.30	±7.00	404.60	±6.00	405.30	±5.40	453.30	±6.50	430.30	±6.20	456.80	±9.10	434.80	±6.70
NIST610	2	#12	466.30	±7.10	441.90	±5.70	442.00	±6.70	405.10	±6.70	405.80	±5.30	463.10	±6.60	430.10	±6.90	455.20	±7.10	441.00	±6.20
NIST610	3	#13	472.20	±7.10	441.10	±5.10	442.40	±5.50	404.30	±7.10	404.80	±6.00	458.30	±7.20	429.50	±7.60	456.00	±8.60	437.90	±6.70
NIST610	3	#14	460.70	±7.80	443.10	±6.00	441.60	±6.40	406.40	±5.50	404.60	±6.20	459.40	±6.00	430.60	±7.00	454.50	±8.00	436.80	±7.10
NIST610	3	#15	465.80	±8.20	439.80	±6.40	441.10	±6.90	407.40	±5.70	408.00	±6.90	459.30	±7.80	431.70	±7.40	457.60	±7.50	440.40	±7.80
NIST610	3	#16	453.40	±8.20	437.50	±6.70	443.50	±6.90	400.70	±5.40	402.60	±6.00	457.00	±6.50	427.90	±6.20	456.40	±8.40	437.10	±7.50
NIST610	4	#17	468.40	±8.70	438.50	±6.50	440.70	±5.70	404.20	±6.70	404.60	±5.30	458.70	±7.80	429.70	±6.90	451.80	±7.00	436.60	±5.40
NIST610	4	#18	469.90	±7.40	445.30	±6.50	445.20	±5.70	406.30	±6.00	406.10	±5.90	458.60	±7.10	431.30	±6.70	460.40	±6.70	439.70	±6.00
NIST610	4	#19	460.20	±6.50	440.10	±5.30	440.60	±4.50	404.50	±5.40	404.60	±5.00	459.50	±6.40	428.10	±6.10	455.40	±5.50	436.50	±5.60
NIST610	4	#20	466.00	±7.10	440.10	±6.20	442.20	±5.80	405.00	±6.10	405.70	±6.20	458.30	±5.70	432.90	±5.90	461.00	±7.30	443.30	±6.50
NIST610	4	#21	464.10	±8.70	442.00	±5.60	442.00	±6.00	404.80	±5.90	403.70	±6.00	457.70	±6.30	425.30	±6.70	450.80	±7.40	435.50	±6.90
NIST610	4	#22	469.50	±7.60	440.40	±5.90	442.20	±5.60	405.10	±5.50	405.50	±4.90	459.70	±6.70	431.90	±6.30	456.50	±7.20	436.70	±7.30
Average			465.59		441.06		442.20		405.00		405.10		458.72		429.95		456.04		438.04	
STD			3.82		2.67		2.11		1.24		1.13		1.99		2.36		2.16		1.87	

Table A2. 3 continued: Trace Element Standard values for LA-ICP-MS sessions. Values are in ppm. Uncertainties are at 2σ level.

Standard	Session	#	9 Be		45 Sc		51 V		53 Cr		59Co		60 Ni		65 Cu		66 Zn		71 Ga	
NIST612	1	#1	39.73	±0.71	39.17	±0.45	37.28	±0.46	34.73	±0.59	34.48	±0.44	38.06	±0.67	35.33	±0.57	36.14	±0.57	36.00	±0.49
NIST612	1	#2	40.84	±0.96	38.43	±0.59	37.10	±0.48	34.25	±0.78	34.38	±0.50	40.00	±2.30	36.85	±0.88	35.14	±0.68	36.03	±0.61
NIST612	1	#3	39.39	±0.93	37.44	±0.61	36.67	±0.50	33.77	±0.96	33.15	±0.56	37.31	±0.83	34.08	±0.70	34.35	±0.82	34.67	±0.69
NIST612	1	#4	39.31	±0.81	37.72	±0.51	36.60	±0.48	33.79	±0.68	34.31	±0.49	38.89	±0.66	35.82	±0.64	35.67	±0.67	36.04	±0.60
NIST612	1	#5	40.04	±0.75	38.58	±0.53	37.48	±0.51	35.44	±0.85	34.28	±0.52	38.80	±0.70	37.50	±2.20	36.80	±1.10	36.37	±0.64
NIST612	1	#6	40.43	±0.80	38.93	±0.52	37.71	±0.49	35.13	±0.72	34.71	±0.46	38.20	±0.62	36.31	±0.67	35.40	±0.67	36.59	±0.55
NIST612	1	#7	40.47	±0.78	38.08	±0.58	37.42	±0.52	35.16	±0.76	34.23	±0.48	37.90	±0.53	35.48	±0.68	35.74	±0.80	35.85	±0.53
NIST612	1	#8	40.20	±0.78	37.84	±0.53	37.55	±0.51	35.00	±0.77	34.44	±0.42	38.08	±0.71	36.21	±0.71	35.55	±0.58	36.69	±0.54
NIST612	1	#9	40.95	±0.72	37.81	±0.49	37.22	±0.49	34.98	±0.76	34.43	±0.50	38.28	±0.65	35.79	±0.66	35.70	±1.00	36.42	±0.57
NIST612	2	#10	40.82	±0.63	37.68	±0.41	36.56	±0.49	34.55	±0.61	34.02	±0.43	38.37	±0.60	36.17	±0.67	34.08	±0.70	35.71	±0.56
NIST612	2	#11	41.10	±0.94	37.71	±0.46	36.55	±0.55	35.57	±0.68	34.29	±0.47	38.18	±0.67	35.75	±0.68	34.05	±0.76	35.93	±0.60
NIST612	2	#12	40.60	±0.84	37.67	±0.55	36.43	±0.59	35.14	±0.72	33.65	±0.51	38.03	±0.74	35.75	±0.71	34.30	±0.66	35.68	±0.60
NIST612	3	#13	41.58	±0.77	38.32	±0.54	36.47	±0.47	35.20	±0.79	34.00	±0.54	39.59	±0.90	34.08	±0.62	39.50	±2.50	36.12	±0.59
NIST612	3	#14	40.61	±0.76	37.96	±0.42	36.43	±0.47	34.75	±0.75	34.11	±0.46	39.49	±0.82	36.15	±0.72	37.40	±1.30	36.61	±0.59
NIST612	3	#15	40.45	±0.85	37.83	±0.55	37.19	±0.52	35.04	±0.64	34.06	±0.59	39.71	±0.87	34.73	±0.58	35.29	±0.80	35.67	±0.59
NIST612	3	#16	40.02	±0.86	37.56	±0.46	36.68	±0.44	34.62	±0.64	34.41	±0.45	38.50	±0.61	36.02	±0.61	36.20	±2.00	36.13	±0.52
NIST612	4	#17	41.26	±0.75	37.71	±0.49	36.38	±0.47	34.50	±0.66	33.53	±0.45	37.27	±0.53	34.50	±0.54	33.98	±0.91	35.41	±0.46
NIST612	4	#18	39.86	±0.81	38.09	±0.48	37.27	±0.42	34.50	±0.78	33.99	±0.54	38.10	±0.59	34.72	±0.67	34.55	±0.72	36.37	±0.55
NIST612	4	#19	39.90	±0.81	37.68	±0.48	36.55	±0.46	34.94	±0.78	33.75	±0.52	37.67	±0.72	35.32	±0.61	35.50	±1.40	36.04	±0.63
NIST612	4	#20	40.42	±0.77	37.94	±0.52	37.13	±0.49	34.83	±0.55	34.60	±0.50	38.06	±0.76	35.29	±0.64	34.20	±0.63	36.30	±0.51
NIST612	4	#21	40.89	±0.84	37.51	±0.47	37.31	±0.49	34.63	±0.74	34.05	±0.48	37.97	±0.81	35.52	±0.62	33.82	±0.59	35.97	±0.59
NIST612	4	#22	40.69	±0.81	37.83	±0.41	37.18	±0.44	35.02	±0.75	34.01	±0.47	37.95	±0.68	34.54	±0.67	34.56	±0.80	35.88	±0.48
Average			40.43		37.98		36.96		34.80		34.13		38.38		35.54		35.36		36.02	
STD			0.57		0.44		0.42		0.45		0.36		0.73		0.84		1.31		0.44	

Table A2. 3 continued: Trace Element Standard values for LA-ICP-MS sessions. Values are in ppm. Uncertainties are at 2σ level.

Standard	Session	#	72 Ge		75 As		77 Se		85 Rb		88 Sr		89 Y		90 Zr		93 Nb		95 Mo	
BCR2G	1	#1	2.08	±0.08	1.42	±0.10	0.51	±0.21	47.92	±0.79	331.50	±5.30	31.24	±0.52	168.20	±2.70	10.41	±0.20	246.90	±4.10
BCR2G	1	#2	2.07	±0.11	1.47	±0.11	0.39	±0.17	47.67	±0.86	331.00	±4.50	31.29	±0.46	168.60	±2.90	10.45	±0.19	244.20	±3.90
BCR2G	1	#3	2.07	±0.14	1.36	±0.12	0.47	±0.26	47.43	±0.92	320.30	±6.00	31.23	±0.56	166.60	±3.40	9.97	±0.19	239.00	±5.00
BCR2G	1	#4	2.04	±0.24	1.27	±0.29	b.d.l	b.d.l	48.90	±1.90	312.00	±12.00	29.81	±0.65	162.40	±2.40	10.10	±0.30	242.20	±4.70
BCR2G	2	#5	1.99	±0.09	1.23	±0.08	0.52	±0.14	47.52	±0.87	320.40	±6.00	30.38	±0.57	166.70	±3.10	10.38	±0.19	242.90	±4.30
BCR2G	3	#6	2.01	±0.09	1.16	±0.08	0.68	±0.17	46.14	±0.72	314.00	±4.40	30.42	±0.50	165.40	±2.40	9.87	±0.17	232.90	±4.00
BCR2G	4	#7	1.92	±0.11	1.27	±0.08	0.55	±0.21	46.84	±0.77	321.70	±5.40	30.21	±0.39	166.30	±2.70	10.06	±0.18	237.10	±3.50
BCR2G	4	#8	1.96	±0.11	1.22	±0.08	0.25	±0.15	46.78	±0.91	316.20	±4.90	30.09	±0.48	167.40	±2.50	10.15	±0.18	241.20	±3.90
Average			2.02		1.30		0.48		47.40		320.89		30.58		166.45		10.17		240.80	
STD			0.06		0.11		0.13		0.84		7.22		0.59		1.93		0.22		4.39	
NIST610	1	#1	426.10	±7.10	316.20	±5.10	108.90	±2.50	425.40	±6.60	515.80	±8.10	447.00	±5.00	439.90	±6.20	418.90	±6.20	410.00	±5.50
NIST610	1	#2	426.40	±6.50	317.50	±4.70	108.70	±2.40	425.90	±6.10	515.30	±6.70	449.30	±4.80	439.00	±5.10	419.30	±5.20	409.90	±4.50
NIST610	1	#3	426.90	±7.70	317.20	±5.40	109.80	±2.80	428.10	±7.50	517.20	±7.40	453.00	±6.00	445.10	±6.60	419.80	±4.80	411.00	±5.40
NIST610	1	#4	425.50	±6.40	316.70	±4.80	108.70	±2.40	424.30	±6.80	514.80	±6.20	443.60	±6.10	437.00	±6.30	418.40	±5.00	409.60	±4.30
NIST610	1	#5	425.60	±5.70	318.00	±5.00	109.10	±2.00	426.20	±6.40	514.70	±6.10	451.30	±6.00	438.80	±5.50	419.00	±4.90	409.90	±4.30
NIST610	1	#6	427.00	±7.40	317.10	±5.40	108.90	±2.80	425.40	±6.60	516.70	±6.40	452.90	±5.50	441.70	±4.90	419.30	±5.20	410.20	±4.80
NIST610	1	#7	426.60	±6.70	317.80	±5.10	109.10	±2.50	426.80	±7.60	515.10	±6.00	448.70	±6.10	440.60	±5.20	418.90	±4.80	410.40	±4.90
NIST610	1	#8	424.20	±7.00	314.70	±5.60	108.90	±2.00	423.60	±6.90	515.00	±7.20	449.60	±5.60	437.10	±5.70	418.10	±6.10	408.90	±4.80
NIST610	1	#9	426.50	±6.00	317.70	±4.30	108.90	±2.80	427.00	±5.80	515.70	±6.00	449.10	±4.70	440.90	±5.10	419.50	±4.40	410.90	±4.70
NIST610	2	#10	428.40	±5.60	317.40	±4.80	108.90	±2.50	429.00	±7.20	518.40	±5.70	452.00	±6.70	439.80	±5.60	419.40	±4.30	410.40	±3.80
NIST610	2	#11	422.90	±6.70	317.70	±4.10	108.30	±2.90	423.90	±7.00	509.40	±7.30	448.10	±6.50	439.10	±6.10	417.00	±5.60	408.60	±5.60
NIST610	2	#12	426.90	±6.00	317.50	±4.80	109.40	±2.20	426.00	±7.40	517.20	±6.70	450.60	±6.50	441.40	±5.90	421.30	±6.60	413.20	±5.40
NIST610	3	#13	424.90	±6.80	314.90	±5.20	108.90	±2.70	424.60	±6.90	514.40	±6.80	449.70	±5.90	438.40	±6.30	418.40	±6.00	410.00	±5.60
NIST610	3	#14	425.90	±6.50	316.20	±5.40	108.80	±2.90	426.30	±7.70	516.50	±6.40	450.10	±6.80	441.20	±6.20	418.70	±6.40	409.30	±5.70
NIST610	3	#15	428.80	±7.50	321.20	±5.10	109.40	±2.50	428.40	±8.40	516.20	±6.70	451.20	±6.30	442.20	±6.70	421.90	±6.60	411.00	±5.50
NIST610	3	#16	424.40	±7.00	317.20	±4.80	108.70	±3.30	424.10	±6.60	514.80	±7.90	448.70	±6.60	437.10	±7.10	416.80	±5.70	409.70	±5.40
NIST610	4	#17	424.70	±7.20	316.80	±4.60	108.50	±2.70	422.00	±7.80	513.50	±7.40	449.30	±6.50	438.70	±8.20	418.50	±5.40	409.80	±5.90
NIST610	4	#18	428.50	±6.40	317.20	±5.00	109.70	±2.10	427.70	±6.80	517.20	±6.60	451.10	±6.30	441.70	±7.00	420.40	±6.30	410.00	±4.80
NIST610	4	#19	424.20	±5.70	317.70	±4.30	110.00	±2.30	425.80	±4.90	515.80	±6.10	450.00	±5.90	439.60	±5.40	418.80	±4.90	410.60	±4.20
NIST610	4	#20	426.90	±6.30	316.20	±3.90	105.80	±2.40	429.00	±6.50	517.60	±6.70	449.90	±5.60	440.70	±6.20	418.60	±5.60	409.20	±5.00
NIST610	4	#21	426.10	±6.80	317.20	±4.30	110.70	±2.50	423.80	±6.80	510.10	±7.60	449.30	±5.90	439.20	±5.00	419.10	±5.90	409.40	±5.50
NIST610	4	#22	425.80	±6.90	317.10	±5.00	109.00	±2.20	424.40	±7.10	517.00	±6.30	450.50	±6.10	440.60	±6.30	419.10	±5.70	410.50	±5.00
Average			426.05		317.15		108.96		425.80		515.38		449.77		439.99		419.05		410.11	
STD			1.45		1.22		0.87		1.84		2.13		1.96		1.86		1.12		0.92	

b.l.d.: Below limits of detection

Table A2. 3 continued: Trace Element Standard values for LA-ICP-MS sessions. Values are in ppm. Uncertainties are at 2σ level.

Standard	Session	#	72 Ge		75 As		77 Se		85 Rb		88 Sr		89 Y		90 Zr		93 Nb		95 Mo	
NIST612	1	#1	36.79	±0.60	32.67	±0.47	14.63	±0.72	31.42	±0.48	77.60	±0.99	37.42	±0.49	37.32	±0.55	34.49	±0.49	35.41	±0.47
NIST612	1	#2	36.69	±0.70	31.32	±0.58	14.59	±0.82	31.05	±0.62	76.00	±1.10	36.65	±0.52	37.14	±0.53	33.76	±0.53	34.82	±0.51
NIST612	1	#3	35.45	±0.59	31.06	±0.57	13.47	±0.80	30.32	±0.53	74.60	±1.20	35.26	±0.60	36.21	±0.68	32.72	±0.52	34.29	±0.58
NIST612	1	#4	36.61	±0.58	31.97	±0.42	14.06	±0.86	31.11	±0.42	75.90	±1.30	35.71	±0.46	36.10	±0.48	33.85	±0.44	35.28	±0.47
NIST612	1	#5	36.75	±0.68	32.75	±0.60	14.42	±0.62	31.49	±0.52	77.50	±1.00	36.98	±0.45	36.40	±0.53	34.28	±0.48	35.57	±0.49
NIST612	1	#6	36.88	±0.63	32.74	±0.54	13.80	±0.60	31.43	±0.51	78.10	±1.00	37.35	±0.53	37.30	±0.58	35.00	±0.45	35.73	±0.49
NIST612	1	#7	36.48	±0.52	32.11	±0.55	13.85	±0.61	30.89	±0.42	76.80	±1.10	36.56	±0.52	36.69	±0.44	34.24	±0.49	35.40	±0.50
NIST612	1	#8	37.20	±0.65	32.81	±0.57	13.76	±0.69	31.34	±0.48	77.60	±1.10	36.58	±0.55	36.91	±0.56	34.27	±0.52	35.61	±0.52
NIST612	1	#9	37.09	±0.58	32.35	±0.57	14.24	±0.62	31.19	±0.50	76.52	±0.99	36.79	±0.51	37.39	±0.50	34.12	±0.47	34.82	±0.42
NIST612	2	#10	36.17	±0.55	32.29	±0.53	14.76	±0.72	31.15	±0.45	75.80	±1.20	35.98	±0.43	36.88	±0.59	33.19	±0.38	35.12	±0.44
NIST612	2	#11	36.25	±0.62	32.43	±0.52	13.96	±0.66	31.29	±0.50	75.70	±1.00	36.06	±0.49	36.79	±0.59	33.92	±0.43	35.24	±0.55
NIST612	2	#12	36.09	±0.65	31.96	±0.49	13.59	±0.63	30.90	±0.53	74.70	±1.10	35.76	±0.58	36.44	±0.40	33.63	±0.48	34.83	±0.55
NIST612	3	#13	35.65	±0.64	31.13	±0.48	13.46	±0.70	31.41	±0.49	75.46	±0.99	36.57	±0.53	37.55	±0.57	33.57	±0.46	35.28	±0.54
NIST612	3	#14	36.79	±0.52	32.26	±0.50	13.34	±0.67	31.29	±0.48	74.55	±0.89	35.80	±0.49	36.99	±0.50	33.39	±0.36	35.09	±0.40
NIST612	3	#15	36.34	±0.68	32.53	±0.53	13.89	±0.71	31.20	±0.56	75.30	±1.20	35.72	±0.59	36.88	±0.53	33.01	±0.37	35.21	±0.50
NIST612	3	#16	36.89	±0.55	32.49	±0.47	14.21	±0.81	31.44	±0.50	74.47	±0.95	35.78	±0.44	36.46	±0.41	33.08	±0.44	35.31	±0.45
NIST612	4	#17	35.66	±0.59	31.57	±0.53	13.79	±0.74	30.55	±0.43	74.43	±0.92	36.14	±0.46	37.19	±0.54	33.69	±0.43	34.78	±0.38
NIST612	4	#18	36.38	±0.50	31.83	±0.54	14.34	±0.66	31.46	±0.56	75.14	±0.84	35.69	±0.48	36.79	±0.53	33.90	±0.47	35.17	±0.45
NIST612	4	#19	36.52	±0.66	32.41	±0.63	14.97	±0.72	30.87	±0.52	75.20	±1.00	35.49	±0.49	36.72	±0.48	33.67	±0.42	35.31	±0.51
NIST612	4	#20	36.78	±0.59	32.20	±0.56	14.92	±0.57	31.11	±0.43	74.49	±0.92	36.21	±0.51	37.02	±0.45	34.01	±0.43	35.49	±0.50
NIST612	4	#21	36.31	±0.57	32.13	±0.47	15.01	±0.62	31.12	±0.48	74.60	±1.00	36.29	±0.51	36.98	±0.51	33.60	±0.45	35.48	±0.39
NIST612	4	#22	36.32	±0.58	31.52	±0.50	14.46	±0.62	30.95	±0.51	75.25	±0.93	35.71	±0.46	36.50	±0.47	33.59	±0.41	34.97	±0.48
Average			36.46		32.12		14.16		31.14		75.71		36.20		36.85		33.77		35.19	
STD			0.45		0.51		0.50		0.29		1.14		0.58		0.38		0.51		0.33	

Table A2. 3 continued: Trace Element Standard values for LA-ICP-MS sessions. Values are in ppm. Uncertainties are at 2σ level.

Standard	Session	#	107 Ag		111 Cd		115 In		118 Sn		121 Sb		125 Te		133 Cs		139 La		140 Ce	
BCR2G	1	#1	0.36	±0.02	0.22	±0.05	0.10	±0.01	4.04	±0.38	0.35	±0.02	0.63	±0.37	1.10	±0.04	25.21	±0.43	51.69	±0.82
BCR2G	1	#2	0.14	±0.02	0.23	±0.05	0.09	±0.01	1.77	±0.05	0.41	±0.03	0.58	±0.33	1.09	±0.04	25.50	±0.41	51.45	±0.75
BCR2G	1	#3	0.16	±0.02	0.34	±0.08	0.10	±0.01	1.85	±0.11	0.38	±0.03	0.29	±0.31	1.10	±0.05	24.88	±0.49	49.94	±0.91
BCR2G	1	#4	0.13	±0.04	0.24	±0.16	0.10	±0.01	2.01	±0.29	0.34	±0.04	-0.05	±0.29	1.17	±0.10	24.30	±1.10	49.30	±1.50
BCR2G	2	#5	0.30	±0.02	0.21	±0.05	0.09	±0.01	1.84	±0.07	0.35	±0.02	0.21	±0.22	1.07	±0.04	24.55	±0.46	49.88	±0.99
BCR2G	3	#6	0.13	±0.01	0.26	±0.05	0.10	±0.01	1.83	±0.06	0.33	±0.02	0.05	±0.16	1.01	±0.03	24.39	±0.33	48.77	±0.78
BCR2G	4	#7	0.24	±0.01	0.30	±0.07	0.09	±0.01	1.81	±0.06	0.35	±0.02	0.44	±0.26	1.06	±0.04	24.42	±0.41	49.19	±0.78
BCR2G	4	#8	0.12	±0.01	0.24	±0.05	0.09	±0.01	1.86	±0.07	0.33	±0.02	0.58	±0.34	1.06	±0.04	24.49	±0.41	49.11	±0.85
Average			0.20		0.25		0.09		2.13		0.35		0.34		1.08		24.72		49.92	
STD			0.09		0.04		0.00		0.78		0.03		0.26		0.05		0.44		1.09	
NIST610	1	#1	237.20	±3.70	259.20	±4.40	440.90	±8.10	396.00	±6.40	368.90	±5.90	####	±52.00	360.50	±6.70	456.90	±6.60	448.20	±6.80
NIST610	1	#2	237.50	±3.10	259.30	±3.30	439.90	±6.20	395.60	±4.60	368.70	±4.60	####	±51.00	362.40	±5.60	456.80	±5.20	447.50	±5.70
NIST610	1	#3	242.50	±4.00	259.60	±3.70	445.20	±8.20	397.90	±6.70	370.60	±5.90	####	±49.00	360.50	±5.90	458.50	±7.00	449.40	±6.20
NIST610	1	#4	236.70	±3.10	258.50	±3.70	439.10	±6.70	395.50	±4.90	368.20	±5.30	####	±49.00	361.00	±5.00	456.30	±6.10	447.20	±6.20
NIST610	1	#5	238.90	±3.20	258.40	±3.50	440.10	±5.90	395.90	±4.80	369.00	±4.50	####	±51.00	361.60	±5.40	457.30	±6.10	447.50	±5.80
NIST610	1	#6	240.60	±3.60	260.40	±3.90	444.10	±7.80	396.10	±5.30	369.30	±6.20	####	±45.00	361.10	±6.60	456.70	±6.30	448.90	±6.70
NIST610	1	#7	240.10	±3.70	258.50	±3.40	441.40	±6.80	396.50	±6.00	369.30	±5.30	####	±55.00	360.50	±6.00	457.80	±6.70	448.10	±5.90
NIST610	1	#8	237.40	±3.90	258.70	±3.90	437.30	±7.50	395.20	±5.80	368.10	±5.70	####	±45.00	360.80	±5.90	455.70	±6.50	448.40	±5.80
NIST610	1	#9	238.10	±3.00	259.40	±3.20	442.10	±6.70	396.10	±4.70	369.20	±4.70	####	±47.00	361.00	±5.60	457.60	±6.00	448.60	±5.80
NIST610	2	#10	238.90	±3.20	258.90	±3.30	444.50	±6.60	397.80	±4.50	370.70	±5.20	####	±54.00	361.10	±5.80	455.70	±5.10	449.00	±5.20
NIST610	2	#11	239.10	±3.20	259.80	±4.40	435.90	±6.00	392.40	±5.20	366.70	±5.10	####	±61.00	360.80	±5.50	451.90	±5.70	443.60	±6.50
NIST610	2	#12	239.40	±3.40	259.40	±3.70	444.80	±7.30	398.80	±5.90	369.40	±5.10	####	±58.00	363.20	±6.30	460.90	±5.00	450.60	±5.50
NIST610	3	#13	238.90	±3.60	257.90	±4.40	440.20	±7.40	395.40	±6.20	368.30	±5.80	####	±56.00	360.00	±6.30	457.00	±6.30	446.90	±6.80
NIST610	3	#14	239.10	±3.30	260.60	±5.20	440.70	±7.80	395.90	±5.40	369.40	±5.60	####	±52.00	359.60	±6.70	456.10	±6.60	449.20	±6.90
NIST610	3	#15	238.80	±3.50	260.00	±4.10	444.60	±7.90	397.80	±5.80	369.90	±5.50	####	±50.00	364.70	±6.70	458.50	±7.10	448.50	±6.00
NIST610	3	#16	239.30	±3.70	257.90	±3.50	438.80	±6.50	394.80	±5.40	368.20	±5.30	####	±55.00	360.30	±6.50	456.90	±7.20	447.40	±6.00
NIST610	4	#17	239.00	±3.60	258.50	±4.50	436.70	±7.50	393.50	±6.90	368.30	±5.90	####	±55.00	360.10	±7.70	456.70	±7.10	442.80	±8.70
NIST610	4	#18	238.80	±3.40	259.90	±4.50	444.90	±6.20	397.60	±5.40	369.90	±5.00	####	±55.00	361.90	±6.00	457.00	±7.70	451.80	±6.50
NIST610	4	#19	239.60	±3.30	259.00	±3.40	440.40	±5.80	396.00	±4.50	368.70	±4.50	####	±49.00	361.10	±5.20	457.80	±5.40	448.40	±5.00
NIST610	4	#20	238.50	±3.10	258.40	±4.60	443.70	±6.30	397.50	±5.80	369.20	±4.70	####	±51.00	360.70	±5.70	455.90	±5.70	447.90	±6.00
NIST610	4	#21	238.90	±3.50	259.10	±4.20	436.10	±7.10	394.20	±6.20	368.40	±5.30	####	±49.00	360.20	±6.00	457.40	±6.00	444.70	±7.00
NIST610	4	#22	239.20	±3.50	259.10	±3.60	442.30	±7.10	396.00	±6.00	369.40	±5.60	####	±49.00	361.60	±6.00	457.00	±6.00	448.90	±5.30
Average			238.93		259.11		441.08		396.02		368.99		####		361.12		456.93		447.89	
STD			1.19		0.72		2.91		1.48		0.87		92.08		1.12		1.56		2.00	

Table A2. 3 continued: Trace Element Standard values for LA-ICP-MS sessions. Values are in ppm. Uncertainties are at 2σ level.

Standard	Session	#	107 Ag		111 Cd		115 In		118 Sn		121 Sb		125 Te		133 Cs		139 La		140 Ce	
NIST612	1	#1	20.67	±0.24	25.78	±0.54	36.71	±0.49	33.93	±0.49	31.35	±0.41	248.60	±7.40	40.21	±0.60	36.77	±0.41	37.40	±0.43
NIST612	1	#2	20.54	±0.32	24.36	±0.59	36.28	±0.62	33.93	±0.53	30.82	±0.50	233.40	±8.00	39.63	±0.82	35.95	±0.59	36.21	±0.59
NIST612	1	#3	20.32	±0.29	24.72	±0.71	34.72	±0.58	32.48	±0.54	30.02	±0.55	235.80	±6.60	38.23	±0.65	34.76	±0.60	35.26	±0.59
NIST612	1	#4	20.49	±0.26	25.90	±0.53	35.94	±0.53	33.52	±0.45	30.39	±0.44	239.70	±6.60	39.52	±0.62	35.62	±0.56	36.17	±0.54
NIST612	1	#5	20.78	±0.29	26.79	±0.47	36.49	±0.61	34.26	±0.52	31.37	±0.47	259.10	±6.80	39.88	±0.68	36.35	±0.49	37.42	±0.59
NIST612	1	#6	21.00	±0.30	25.81	±0.57	36.84	±0.58	34.13	±0.53	31.36	±0.45	245.30	±7.20	40.41	±0.72	36.88	±0.48	37.80	±0.44
NIST612	1	#7	20.46	±0.32	26.24	±0.59	36.14	±0.66	33.68	±0.56	31.07	±0.42	260.90	±7.10	39.80	±0.67	35.98	±0.57	36.93	±0.57
NIST612	1	#8	20.55	±0.27	25.39	±0.58	36.70	±0.49	34.06	±0.39	31.24	±0.40	247.60	±8.30	39.63	±0.57	36.10	±0.52	36.97	±0.50
NIST612	1	#9	20.17	±0.27	25.27	±0.49	36.44	±0.66	34.11	±0.54	31.02	±0.38	233.50	±7.70	39.64	±0.67	36.28	±0.50	36.70	±0.51
NIST612	2	#10	20.92	±0.32	24.82	±0.56	35.31	±0.50	33.63	±0.42	30.90	±0.41	278.30	±7.40	39.22	±0.63	35.60	±0.45	36.39	±0.47
NIST612	2	#11	20.54	±0.26	25.11	±0.60	35.22	±0.59	33.74	±0.47	30.83	±0.45	271.40	±8.20	39.12	±0.57	35.44	±0.43	36.12	±0.48
NIST612	2	#12	20.35	±0.31	24.29	±0.51	35.34	±0.61	33.43	±0.50	30.62	±0.45	271.60	±9.20	38.57	±0.66	35.03	±0.53	36.28	±0.51
NIST612	3	#13	18.86	±0.30	24.40	±0.56	34.98	±0.65	33.65	±0.54	30.10	±0.41	271.20	±7.80	38.47	±0.60	35.61	±0.54	36.41	±0.56
NIST612	3	#14	20.35	±0.24	24.51	±0.52	35.28	±0.53	33.84	±0.38	30.87	±0.38	257.40	±8.70	38.86	±0.58	35.18	±0.48	35.62	±0.42
NIST612	3	#15	19.43	±0.31	24.28	±0.51	34.68	±0.56	33.72	±0.50	30.56	±0.43	254.00	±8.10	38.68	±0.64	34.69	±0.48	35.88	±0.54
NIST612	3	#16	19.96	±0.28	24.61	±0.48	35.47	±0.47	33.94	±0.41	30.94	±0.39	240.00	±5.80	38.84	±0.53	34.76	±0.43	35.81	±0.42
NIST612	4	#17	19.39	±0.32	23.95	±0.52	34.66	±0.51	33.73	±0.43	30.80	±0.42	267.60	±7.40	37.92	±0.56	35.48	±0.44	35.95	±0.50
NIST612	4	#18	19.53	±0.28	23.78	±0.54	35.43	±0.47	33.74	±0.43	30.80	±0.40	254.10	±8.70	38.87	±0.63	35.34	±0.49	36.05	±0.56
NIST612	4	#19	20.21	±0.32	24.71	±0.56	35.35	±0.57	33.59	±0.48	31.07	±0.48	250.60	±7.20	39.03	±0.68	34.93	±0.43	35.93	±0.49
NIST612	4	#20	21.10	±0.26	25.36	±0.57	35.46	±0.53	33.65	±0.45	30.97	±0.42	254.10	±7.20	39.00	±0.55	35.44	±0.47	36.11	±0.45
NIST612	4	#21	20.68	±0.28	24.93	±0.64	35.08	±0.49	33.74	±0.44	30.85	±0.37	243.90	±7.80	38.69	±0.56	35.29	±0.51	35.98	±0.53
NIST612	4	#22	19.77	±0.27	24.60	±0.47	34.80	±0.55	33.47	±0.47	30.88	±0.40	242.30	±8.10	37.96	±0.58	35.05	±0.48	35.89	±0.45
Average			20.28		24.98		35.61		33.73		30.86		252.75		39.10		35.57		36.33	
STD			0.56		0.75		0.70		0.35		0.35		12.98		0.67		0.61		0.62	

Table A2. 3 continued: Trace Element Standard values for LA-ICP-MS sessions. Values are in ppm. Uncertainties are at 2σ level.

Standard	Session	#	141 Pr		146 Nd		147 Sm		153 Eu		157 Gd		159 Tb		163 Dy		165 Ho		166 Er	
BCR2G	1	#1	6.31	±0.14	27.59	±0.54	6.52	±0.21	1.93	±0.05	6.28	±0.26	1.02	±0.04	5.82	±0.16	1.22	±0.04	3.30	±0.11
BCR2G	1	#2	6.29	±0.11	27.88	±0.54	6.48	±0.20	1.92	±0.06	6.30	±0.19	1.03	±0.03	5.93	±0.15	1.19	±0.04	3.31	±0.11
BCR2G	1	#3	6.26	±0.11	27.71	±0.69	6.21	±0.21	1.90	±0.08	6.42	±0.22	0.97	±0.03	5.88	±0.23	1.19	±0.04	3.18	±0.11
BCR2G	1	#4	5.94	±0.26	26.99	±0.99	6.55	±0.28	1.84	±0.13	6.08	±0.38	0.90	±0.04	5.40	±0.23	1.17	±0.11	3.16	±0.29
BCR2G	2	#5	6.30	±0.14	28.49	±0.63	6.21	±0.22	1.88	±0.06	6.19	±0.18	0.94	±0.02	5.86	±0.14	1.18	±0.03	3.30	±0.10
BCR2G	3	#6	5.99	±0.14	27.96	±0.54	6.24	±0.20	1.88	±0.06	6.36	±0.19	0.94	±0.03	5.85	±0.14	1.19	±0.03	3.21	±0.09
BCR2G	4	#7	6.10	±0.12	27.25	±0.51	6.35	±0.20	1.88	±0.05	6.28	±0.18	0.94	±0.03	5.94	±0.17	1.18	±0.03	3.22	±0.08
BCR2G	4	#8	6.04	±0.13	27.41	±0.45	6.18	±0.18	1.87	±0.05	6.27	±0.15	0.92	±0.02	5.81	±0.13	1.17	±0.03	3.29	±0.10
Average			6.15		27.66		6.34		1.89		6.27		0.96		5.81		1.18		3.25	
STD			0.15		0.47		0.15		0.03		0.10		0.04		0.17		0.02		0.06	
NIST610	1	#1	431.00	±6.20	431.50	±7.30	451.20	±5.80	461.30	±6.90	443.50	±7.30	442.90	±7.10	429.10	±7.30	449.60	±6.90	426.50	±7.10
NIST610	1	#2	435.90	±5.90	431.00	±5.80	450.90	±4.80	460.60	±5.90	444.20	±5.30	443.60	±5.60	428.10	±4.60	450.40	±6.00	426.00	±5.30
NIST610	1	#3	434.00	±5.90	432.30	±6.50	452.00	±5.80	462.30	±5.50	445.40	±5.90	444.10	±6.50	433.70	±5.20	451.10	±5.80	426.50	±4.70
NIST610	1	#4	424.10	±4.60	430.30	±6.00	450.60	±4.20	460.30	±5.30	443.00	±5.60	442.40	±5.20	417.30	±5.30	446.50	±5.20	425.60	±5.30
NIST610	1	#5	431.00	±4.90	430.20	±5.40	450.20	±5.90	460.20	±5.70	444.50	±5.10	442.80	±5.30	425.30	±5.00	447.50	±5.60	425.00	±5.50
NIST610	1	#6	432.80	±6.90	432.00	±5.70	451.80	±5.70	462.00	±6.20	443.60	±5.60	444.00	±5.90	430.90	±5.90	453.40	±7.20	427.00	±5.40
NIST610	1	#7	427.50	±6.00	430.80	±5.80	451.20	±6.40	460.80	±5.90	444.50	±5.50	442.50	±4.90	424.60	±4.70	448.00	±5.70	426.10	±6.00
NIST610	1	#8	418.90	±5.90	430.50	±6.40	449.80	±6.40	460.80	±4.90	443.70	±5.60	442.70	±6.90	423.30	±6.20	447.10	±6.20	425.10	±5.70
NIST610	1	#9	432.80	±5.10	431.10	±5.50	451.30	±4.60	460.90	±5.80	442.90	±5.40	442.90	±4.40	424.60	±4.90	449.00	±5.20	426.20	±4.80
NIST610	2	#10	431.10	±5.60	433.10	±5.80	453.50	±7.20	461.20	±5.40	444.60	±5.00	445.40	±5.80	430.50	±6.50	452.50	±5.60	427.30	±3.70
NIST610	2	#11	425.70	±6.10	426.20	±6.70	448.90	±6.30	460.40	±6.00	442.60	±7.40	441.60	±6.30	424.60	±6.10	444.60	±6.50	422.30	±5.90
NIST610	2	#12	433.80	±5.70	433.10	±6.30	452.80	±6.70	461.30	±6.60	444.30	±5.90	443.70	±6.60	428.00	±5.80	450.90	±6.00	429.30	±5.80
NIST610	3	#13	428.30	±6.40	430.20	±6.90	450.20	±6.70	460.20	±6.00	443.60	±6.90	442.40	±6.80	426.80	±6.00	448.10	±7.30	425.40	±5.90
NIST610	3	#14	430.70	±5.60	430.90	±6.40	451.10	±7.10	461.80	±6.50	443.50	±6.40	442.80	±7.50	426.40	±6.30	450.00	±6.60	426.70	±6.80
NIST610	3	#15	432.20	±7.20	433.90	±7.60	454.30	±7.30	461.50	±6.50	445.40	±6.30	445.20	±6.80	429.00	±6.90	449.10	±6.20	426.90	±6.50
NIST610	3	#16	429.90	±5.60	429.10	±6.90	447.90	±7.40	461.90	±7.60	442.80	±8.10	441.80	±6.00	425.80	±6.90	448.60	±7.10	424.40	±7.30
NIST610	4	#17	424.80	±8.10	430.30	±6.30	450.90	±7.30	455.50	±6.50	442.10	±7.60	442.50	±5.60	425.90	±7.00	448.20	±7.20	423.40	±6.60
NIST610	4	#18	434.00	±5.90	431.50	±6.10	450.90	±5.70	468.80	±7.20	446.00	±5.90	444.60	±7.00	429.10	±6.50	450.60	±7.50	429.60	±6.80
NIST610	4	#19	429.70	±4.80	431.80	±5.10	451.20	±6.00	460.50	±5.80	443.50	±5.30	442.50	±5.80	426.10	±5.80	448.70	±6.00	424.70	±5.80
NIST610	4	#20	431.50	±6.50	430.60	±5.30	451.80	±6.30	463.80	±6.80	444.30	±5.50	442.90	±6.30	427.60	±6.40	449.10	±6.10	428.00	±6.00
NIST610	4	#21	426.90	±6.00	430.30	±5.90	449.80	±5.90	460.00	±6.50	443.00	±5.80	442.90	±6.10	425.80	±6.60	448.50	±6.20	425.40	±6.00
NIST610	4	#22	431.20	±6.00	431.50	±6.80	451.60	±6.40	459.50	±6.00	444.60	±6.20	443.10	±6.00	427.40	±4.90	449.30	±6.30	425.40	±5.40
Average			429.90		431.01		451.09		461.16		443.89		443.15		426.81		449.13		426.04	
STD			3.88		1.53		1.37		2.22		0.96		0.97		3.17		1.90		1.65	

Table A2. 3 continued: Trace Element Standard values for LA-ICP-MS sessions. Values are in ppm. Uncertainties are at 2σ level.

Standard	Session	#	141 Pr		146 Nd		147 Sm		153 Eu		157 Gd		159 Tb		163 Dy		165 Ho		166 Er	
NIST612	1	#1	35.58	±0.45	34.69	±0.54	37.11	±0.67	36.28	±0.58	36.79	±0.60	37.10	±0.48	34.69	±0.54	37.06	±0.49	35.52	±0.57
NIST612	1	#2	35.66	±0.52	34.58	±0.60	36.67	±0.63	35.55	±0.51	36.51	±0.71	35.75	±0.52	34.76	±0.53	36.62	±0.50	35.29	±0.55
NIST612	1	#3	34.10	±0.60	33.48	±0.55	35.83	±0.73	34.44	±0.64	35.78	±0.69	34.79	±0.49	32.89	±0.59	35.39	±0.71	34.50	±0.65
NIST612	1	#4	34.41	±0.44	34.54	±0.59	36.51	±0.58	35.20	±0.49	35.87	±0.65	35.40	±0.42	33.30	±0.48	35.43	±0.50	34.89	±0.53
NIST612	1	#5	35.84	±0.46	34.59	±0.62	36.78	±0.53	35.72	±0.50	36.14	±0.60	35.92	±0.51	34.12	±0.49	36.67	±0.51	35.44	±0.49
NIST612	1	#6	35.96	±0.54	34.94	±0.58	37.25	±0.62	36.36	±0.58	36.85	±0.61	37.16	±0.50	34.12	±0.53	37.34	±0.53	35.65	±0.64
NIST612	1	#7	35.18	±0.54	34.72	±0.48	36.68	±0.51	35.83	±0.53	36.32	±0.57	36.35	±0.56	33.80	±0.54	36.47	±0.46	34.93	±0.58
NIST612	1	#8	35.34	±0.47	34.92	±0.58	36.92	±0.61	36.27	±0.50	36.76	±0.61	36.63	±0.52	33.66	±0.47	36.44	±0.47	35.35	±0.53
NIST612	1	#9	35.42	±0.54	34.83	±0.48	36.71	±0.55	35.96	±0.52	37.38	±0.57	36.56	±0.50	34.32	±0.56	36.50	±0.59	34.99	±0.47
NIST612	2	#10	34.92	±0.48	34.81	±0.51	36.33	±0.61	34.89	±0.50	36.71	±0.56	35.55	±0.46	33.95	±0.50	35.89	±0.48	35.35	±0.54
NIST612	2	#11	35.24	±0.51	34.79	±0.50	36.45	±0.57	35.06	±0.43	36.39	±0.59	35.46	±0.50	34.19	±0.54	35.83	±0.43	35.27	±0.50
NIST612	2	#12	34.58	±0.56	34.64	±0.68	36.34	±0.56	34.69	±0.46	35.70	±0.56	34.94	±0.48	33.52	±0.53	35.55	±0.45	34.55	±0.48
NIST612	3	#13	34.70	±0.58	35.51	±0.66	36.71	±0.57	34.96	±0.53	37.32	±0.66	35.91	±0.51	34.03	±0.56	36.32	±0.51	35.50	±0.57
NIST612	3	#14	34.57	±0.47	34.66	±0.54	36.46	±0.49	34.55	±0.46	36.60	±0.52	35.10	±0.55	33.80	±0.50	35.54	±0.42	34.87	±0.45
NIST612	3	#15	34.43	±0.56	34.39	±0.55	36.34	±0.65	34.63	±0.44	36.29	±0.60	34.75	±0.53	33.85	±0.52	35.30	±0.60	34.96	±0.54
NIST612	3	#16	34.53	±0.43	34.07	±0.58	36.71	±0.62	34.75	±0.41	36.10	±0.48	34.88	±0.49	33.92	±0.49	35.06	±0.51	35.07	±0.47
NIST612	4	#17	34.73	±0.42	34.44	±0.50	36.55	±0.54	35.08	±0.48	36.46	±0.50	35.21	±0.49	34.09	±0.40	35.84	±0.47	34.91	±0.40
NIST612	4	#18	34.93	±0.45	34.59	±0.48	36.55	±0.60	35.18	±0.62	36.43	±0.47	35.17	±0.46	33.70	±0.50	35.48	±0.50	35.08	±0.46
NIST612	4	#19	34.31	±0.46	34.07	±0.51	36.35	±0.62	35.13	±0.44	36.11	±0.55	35.12	±0.55	33.90	±0.47	35.59	±0.48	35.21	±0.52
NIST612	4	#20	34.48	±0.41	34.58	±0.52	35.97	±0.52	34.98	±0.47	36.53	±0.57	35.42	±0.49	34.19	±0.41	35.80	±0.45	35.10	±0.44
NIST612	4	#21	34.45	±0.44	34.56	±0.54	36.83	±0.57	34.68	±0.44	36.90	±0.52	35.44	±0.51	34.27	±0.57	35.77	±0.49	35.22	±0.44
NIST612	4	#22	34.34	±0.51	34.64	±0.57	36.66	±0.56	34.64	±0.44	36.54	±0.67	35.24	±0.50	33.73	±0.49	35.39	±0.44	35.21	±0.47
Average			34.90		34.59		36.58		35.22		36.48		35.63		33.95		35.97		35.13	
STD			0.53		0.38		0.32		0.59		0.43		0.70		0.41		0.60		0.29	

Table A2. 3 continued: Trace Element Standard values for LA-ICP-MS sessions. Values are in ppm. Uncertainties are at 2σ level.

Standard	Session	#	169 Tm		172 Yb		175 Lu		178 Hf		181 Ta		182 W		205 Tl		208 Pb		209 Bi	
BCR2G	1	#1	0.46	±0.02	3.08	±0.11	0.46	±0.02	4.64	±0.10	0.69	±0.02	0.51	±0.05	0.22	±0.02	10.84	±0.25	0.06	±0.01
BCR2G	1	#2	0.45	±0.02	3.16	±0.11	0.48	±0.02	4.65	±0.10	0.71	±0.02	0.48	±0.04	0.23	±0.02	10.46	±0.22	0.05	±0.01
BCR2G	1	#3	0.44	±0.03	3.11	±0.13	0.45	±0.02	4.60	±0.13	0.72	±0.03	0.52	±0.05	0.24	±0.02	10.73	±0.39	0.06	±0.01
BCR2G	1	#4	0.76	±0.62	3.08	±0.25	0.44	±0.06	4.40	±0.27	0.71	±0.05	0.48	±0.10	0.24	±0.05	10.77	±0.55	0.05	±0.01
BCR2G	2	#5	0.44	±0.02	3.13	±0.12	0.45	±0.02	4.48	±0.12	0.68	±0.03	0.49	±0.03	0.24	±0.01	10.58	±0.21	0.05	±0.01
BCR2G	3	#6	0.45	±0.02	3.16	±0.10	0.44	±0.02	4.54	±0.10	0.65	±0.02	0.47	±0.04	0.25	±0.02	10.72	±0.22	0.05	±0.00
BCR2G	4	#7	0.44	±0.02	3.06	±0.12	0.43	±0.02	4.42	±0.10	0.67	±0.02	0.46	±0.03	0.24	±0.02	10.68	±0.22	0.05	±0.00
BCR2G	4	#8	0.44	±0.02	3.15	±0.09	0.45	±0.01	4.59	±0.13	0.69	±0.03	0.46	±0.03	0.26	±0.02	10.86	±0.23	0.06	±0.01
Average			0.49		3.12		0.45		4.54		0.69		0.48		0.24		10.71		0.06	
STD			0.11		0.04		0.01		0.10		0.02		0.02		0.01		0.13		0.00	
NIST610	1	#1	420.60	±5.80	448.40	±6.70	435.10	±6.60	432.20	±5.90	452.10	±6.40	445.00	±6.00	59.70	±1.00	425.80	±7.10	358.00	±5.70
NIST610	1	#2	419.40	±4.80	448.70	±5.70	434.70	±5.30	431.80	±5.00	451.80	±5.50	444.70	±5.60	60.17	±0.85	425.60	±5.90	357.80	±4.80
NIST610	1	#3	425.30	±5.50	452.90	±6.00	436.00	±6.20	432.70	±5.30	453.20	±5.20	446.20	±5.70	62.00	±1.10	427.90	±6.90	359.10	±5.90
NIST610	1	#4	416.30	±4.80	437.70	±5.00	434.60	±5.20	431.60	±4.90	451.20	±5.40	444.30	±5.20	60.07	±0.78	425.20	±5.80	357.60	±4.50
NIST610	1	#5	418.70	±4.30	442.00	±5.50	433.50	±4.50	430.80	±6.40	451.70	±5.90	444.70	±6.20	61.88	±0.83	426.10	±3.90	357.80	±4.90
NIST610	1	#6	423.50	±6.40	447.10	±6.50	435.80	±5.20	433.10	±5.30	452.10	±5.70	445.90	±7.10	61.06	±0.90	425.60	±5.80	358.20	±4.70
NIST610	1	#7	421.80	±6.00	444.80	±5.70	434.90	±4.70	431.80	±6.00	452.50	±5.60	445.10	±5.90	60.64	±0.88	426.70	±6.40	358.50	±4.50
NIST610	1	#8	415.70	±5.90	441.60	±5.70	434.10	±5.30	431.10	±6.60	451.20	±5.90	443.70	±6.60	60.84	±0.89	425.50	±5.90	356.60	±5.50
NIST610	1	#9	418.90	±5.00	442.50	±5.20	435.60	±4.90	432.20	±5.40	452.00	±4.40	445.50	±5.60	60.81	±0.58	426.10	±5.30	358.40	±4.40
NIST610	2	#10	423.70	±5.90	446.90	±5.80	437.80	±5.80	433.00	±5.80	453.20	±5.90	444.10	±4.90	60.37	±0.97	427.60	±5.50	358.80	±4.80
NIST610	2	#11	417.80	±6.10	445.50	±5.90	432.60	±6.00	430.90	±6.90	449.00	±6.00	444.10	±6.60	61.97	±0.79	424.10	±6.20	357.10	±5.30
NIST610	2	#12	420.40	±6.60	445.50	±5.40	438.00	±6.30	432.10	±6.10	453.50	±6.70	447.00	±6.50	60.52	±0.87	428.20	±7.00	359.30	±5.30
NIST610	3	#13	419.60	±6.40	444.10	±6.70	434.40	±5.60	431.40	±5.70	450.50	±6.60	444.30	±6.40	61.04	±0.96	425.60	±5.80	357.50	±5.30
NIST610	3	#14	420.00	±6.10	445.40	±7.00	435.50	±6.10	432.30	±6.80	453.50	±6.60	445.90	±6.50	60.87	±0.95	424.30	±6.20	357.80	±5.30
NIST610	3	#15	421.00	±5.60	447.70	±6.70	436.10	±7.00	433.70	±7.20	452.00	±6.00	446.10	±7.20	61.03	±0.82	429.40	±6.60	359.80	±5.40
NIST610	3	#16	418.90	±6.40	441.80	±7.10	434.20	±6.30	431.80	±6.80	452.40	±7.90	443.50	±6.50	61.14	±0.84	426.00	±5.60	356.90	±4.90
NIST610	4	#17	418.70	±6.70	441.10	±6.40	430.20	±7.30	426.60	±6.50	451.20	±6.70	441.90	±7.60	62.70	±0.84	425.70	±7.00	356.70	±5.30
NIST610	4	#18	422.10	±6.70	449.30	±6.20	439.50	±6.40	437.70	±6.40	453.50	±6.80	447.40	±5.50	60.50	±0.91	426.00	±5.30	360.80	±4.10
NIST610	4	#19	419.60	±5.40	445.40	±5.80	435.50	±5.70	433.40	±4.80	451.50	±5.40	444.40	±5.30	61.90	±0.76	427.00	±5.50	355.70	±4.20
NIST610	4	#20	420.90	±6.20	446.60	±6.80	436.20	±6.50	430.10	±6.30	452.40	±5.80	446.60	±6.10	55.83	±0.83	425.20	±5.50	357.80	±4.60
NIST610	4	#21	418.00	±6.40	441.50	±6.40	432.00	±6.00	432.70	±5.80	450.90	±6.50	442.40	±6.00	61.70	±0.96	425.50	±6.30	357.40	±5.30
NIST610	4	#22	420.60	±5.10	445.70	±5.80	435.80	±5.80	430.90	±5.30	452.50	±6.00	446.30	±7.00	63.41	±0.83	426.40	±6.00	359.20	±5.30
Average			420.07		445.10		435.10		432.00		452.00		444.96		60.92		426.16		358.04	
STD			2.25		3.33		1.96		1.89		1.07		1.38		1.41		1.22		1.14	

Table A2. 3 continued: Trace Element Standard values for LA-ICP-MS sessions. Values are in ppm. Uncertainties are at 2σ level.

Standard	Session	#	169 Tm		172 Yb		175 Lu		178 Hf		181 Ta		182 W		205 Tl		208 Pb		209 Bi	
NIST612	1	#1	35.04	±0.46	37.18	±0.57	35.72	±0.45	36.32	±0.54	37.37	±0.48	37.57	±0.54	14.75	±0.20	37.58	±0.48	31.09	±0.36
NIST612	1	#2	34.30	±0.44	37.53	±0.62	34.64	±0.51	36.11	±0.54	36.29	±0.58	37.19	±0.58	14.35	±0.22	36.95	±0.56	29.91	±0.45
NIST612	1	#3	33.06	±0.54	36.11	±0.69	33.49	±0.64	35.68	±0.63	35.21	±0.58	36.47	±0.73	14.25	±0.23	36.45	±0.61	29.46	±0.43
NIST612	1	#4	33.29	±0.45	36.30	±0.57	34.03	±0.41	35.58	±0.62	35.88	±0.50	36.93	±0.57	14.27	±0.22	37.31	±0.46	29.77	±0.39
NIST612	1	#5	34.51	±0.47	36.91	±0.57	35.02	±0.51	35.67	±0.60	36.94	±0.51	37.69	±0.52	14.92	±0.23	37.19	±0.60	30.83	±0.43
NIST612	1	#6	35.39	±0.49	37.68	±0.48	35.70	±0.51	36.17	±0.52	37.38	±0.51	37.95	±0.45	14.88	±0.18	37.88	±0.54	31.06	±0.43
NIST612	1	#7	34.21	±0.50	36.23	±0.56	35.33	±0.57	35.59	±0.55	36.47	±0.47	37.48	±0.57	14.69	±0.22	37.57	±0.69	30.55	±0.42
NIST612	1	#8	34.36	±0.43	36.65	±0.57	35.51	±0.44	35.92	±0.57	36.66	±0.56	37.52	±0.62	14.77	±0.22	37.53	±0.56	30.71	±0.38
NIST612	1	#9	34.44	±0.48	37.08	±0.62	34.85	±0.50	36.22	±0.57	36.94	±0.45	37.51	±0.56	14.22	±0.23	37.38	±0.53	29.98	±0.37
NIST612	2	#10	33.51	±0.42	36.59	±0.47	34.38	±0.49	35.64	±0.55	35.93	±0.42	37.53	±0.48	15.78	±0.26	37.10	±0.45	29.33	±0.42
NIST612	2	#11	33.81	±0.47	37.11	±0.57	34.17	±0.54	36.15	±0.44	36.39	±0.44	37.31	±0.49	14.83	±0.22	37.24	±0.53	29.54	±0.39
NIST612	2	#12	33.36	±0.57	36.71	±0.59	34.06	±0.56	35.45	±0.57	35.76	±0.50	37.07	±0.67	14.30	±0.22	36.98	±0.58	29.17	±0.37
NIST612	3	#13	33.64	±0.48	37.64	±0.66	34.37	±0.48	36.74	±0.53	36.15	±0.55	37.93	±0.62	12.76	±0.22	36.18	±0.60	28.96	±0.47
NIST612	3	#14	33.16	±0.37	36.80	±0.53	33.94	±0.44	36.06	±0.39	35.48	±0.40	37.31	±0.47	14.57	±0.22	36.93	±0.51	29.16	±0.36
NIST612	3	#15	33.08	±0.59	36.92	±0.58	33.79	±0.45	35.92	±0.61	35.38	±0.56	37.34	±0.53	13.33	±0.20	36.58	±0.54	28.52	±0.39
NIST612	3	#16	32.93	±0.41	37.21	±0.56	33.67	±0.42	35.80	±0.52	35.44	±0.44	37.70	±0.63	13.56	±0.23	36.49	±0.50	29.08	±0.35
NIST612	4	#17	33.39	±0.43	36.99	±0.55	34.06	±0.36	36.11	±0.46	35.94	±0.45	37.10	±0.55	12.17	±0.17	36.46	±0.49	29.52	±0.38
NIST612	4	#18	33.00	±0.44	37.28	±0.63	33.99	±0.48	35.93	±0.55	35.58	±0.53	37.33	±0.55	13.16	±0.24	36.29	±0.48	29.22	±0.39
NIST612	4	#19	33.01	±0.45	37.32	±0.52	33.98	±0.43	36.34	±0.44	35.78	±0.47	37.24	±0.53	14.78	±0.20	36.96	±0.60	29.56	±0.43
NIST612	4	#20	33.31	±0.40	36.85	±0.44	34.11	±0.45	36.17	±0.42	36.04	±0.43	37.40	±0.42	15.03	±0.21	37.19	±0.49	29.48	±0.32
NIST612	4	#21	33.70	±0.48	36.96	±0.53	34.11	±0.49	35.65	±0.43	36.08	±0.45	37.16	±0.56	14.77	±0.21	37.18	±0.55	29.18	±0.35
NIST612	4	#22	33.50	±0.50	37.12	±0.53	34.30	±0.46	35.90	±0.47	35.66	±0.45	37.07	±0.56	13.69	±0.19	36.32	±0.51	29.08	±0.35
Average			33.73		36.96		34.42		35.96		36.13		37.35		14.27		36.99		29.69	
STD			0.68		0.41		0.64		0.31		0.61		0.33		0.82		0.47		0.71	

Table A2. 3 continued: Trace Element Standard values for LA-ICP-MS sessions. Values are in ppm. Uncertainties are at 2σ level.

Standard	Session	#	232 Th		238 U	
BCR2G	1	#1	5.72	±0.13	1.71	±0.05
BCR2G	1	#2	5.66	±0.12	1.68	±0.05
BCR2G	1	#3	5.66	±0.13	1.58	±0.07
BCR2G	1	#4	5.42	±0.10	1.67	±0.13
BCR2G	2	#5	5.51	±0.10	1.62	±0.05
BCR2G	3	#6	5.46	±0.10	1.60	±0.04
BCR2G	4	#7	5.48	±0.12	1.60	±0.05
BCR2G	4	#8	5.44	±0.09	1.59	±0.04
Average			5.54		1.63	
STD			0.12		0.05	
NIST610	1	#1	459.80	±7.10	461.90	±7.40
NIST610	1	#2	458.70	±6.00	461.50	±6.30
NIST610	1	#3	460.50	±6.00	462.00	±6.50
NIST610	1	#4	449.70	±5.90	461.20	±6.20
NIST610	1	#5	455.40	±5.50	460.60	±5.90
NIST610	1	#6	461.80	±5.90	463.00	±7.20
NIST610	1	#7	454.40	±5.40	461.40	±6.80
NIST610	1	#8	447.90	±6.00	460.30	±7.00
NIST610	1	#9	457.90	±5.60	461.90	±5.00
NIST610	2	#10	459.90	±5.90	463.60	±6.00
NIST610	2	#11	454.50	±7.60	458.80	±7.40
NIST610	2	#12	457.70	±5.80	462.20	±5.50
NIST610	3	#13	456.60	±7.00	461.20	±6.80
NIST610	3	#14	456.90	±6.80	460.50	±7.10
NIST610	3	#15	460.80	±7.80	463.80	±6.70
NIST610	3	#16	455.30	±6.50	460.40	±6.70
NIST610	4	#17	456.20	±7.00	460.80	±7.20
NIST610	4	#18	458.30	±6.10	463.00	±7.40
NIST610	4	#19	457.40	±6.10	460.80	±6.80
NIST610	4	#20	457.00	±5.10	462.00	±6.90
NIST610	4	#21	456.50	±6.30	460.70	±6.80
NIST610	4	#22	457.60	±6.40	461.70	±5.30
Average			456.85		461.51	
STD			3.22		1.15	

Table A2. 3 continued: Trace Element Standard values for LA-ICP-MS sessions. Values are in ppm. Uncertainties are at 2σ level.

Standard	Session	#	232 Th		238 U	
NIST612	1	#1	37.27	±0.58	37.12	±0.51
NIST612	1	#2	36.89	±0.49	35.88	±0.56
NIST612	1	#3	35.07	±0.64	34.99	±0.69
NIST612	1	#4	35.37	±0.45	35.70	±0.45
NIST612	1	#5	36.79	±0.49	37.08	±0.61
NIST612	1	#6	37.49	±0.52	36.98	±0.50
NIST612	1	#7	36.51	±0.58	36.90	±0.61
NIST612	1	#8	36.14	±0.54	36.79	±0.53
NIST612	1	#9	36.94	±0.49	36.42	±0.56
NIST612	2	#10	36.02	±0.48	35.42	±0.48
NIST612	2	#11	35.98	±0.46	36.12	±0.43
NIST612	2	#12	35.56	±0.54	35.22	±0.54
NIST612	3	#13	36.36	±0.53	35.90	±0.56
NIST612	3	#14	35.52	±0.42	35.25	±0.41
NIST612	3	#15	35.33	±0.49	35.40	±0.54
NIST612	3	#16	35.45	±0.42	34.99	±0.51
NIST612	4	#17	36.12	±0.46	35.87	±0.46
NIST612	4	#18	35.42	±0.46	35.05	±0.54
NIST612	4	#19	35.27	±0.48	35.18	±0.53
NIST612	4	#20	35.83	±0.39	35.42	±0.44
NIST612	4	#21	36.02	±0.50	35.73	±0.46
NIST612	4	#22	35.72	±0.45	35.27	±0.47
Average			36.05		35.85	
STD			0.67		0.71	

Table A2. 4: Trace Element composition of Samples from Centinela district. Values are in ppm. Uncertainty is 2 standard error.

Sample	Session	9 Be		45 Sc		51 V		53 Cr		59 Co		60 Ni		65 Cu		66 Zn		71 Ga	
353362	1	1.70	±0.39	7.47	±0.43	59.50	±3.89	13.84	±1.46	4.64	±0.32	10.59	±1.23	1946.00	±80.40	49.86	±12.62	15.17	±0.85
353363	1	1.87	±0.47	11.93	±0.55	99.52	±2.40	20.84	±1.98	10.81	±0.55	15.18	±4.90	24.74	±2.08	72.42	±24.76	22.21	±1.01
353364	1	2.15	±0.51	10.88	±0.59	97.26	±2.18	17.20	±1.72	10.83	±0.51	77.36	±3.98	20.94	±1.80	78.18	±16.12	22.58	±1.18
353367	1	2.02	±0.53	14.85	±1.05	138.40	±18.15	20.78	±2.32	11.52	±0.76	23.58	±2.14	344.00	±18.20	64.94	±10.38	23.62	±1.58
353368	1	2.31	±0.54	12.19	±0.62	106.14	±4.81	20.12	±1.82	7.83	±0.43	14.08	±1.98	947.40	±30.20	50.28	±4.58	22.67	±1.00
353369	1	1.83	±0.52	14.59	±0.94	144.94	±13.02	22.76	±2.60	9.41	±0.69	17.22	±1.86	3168.00	±168.00	58.56	±6.02	28.66	±1.90
353370	1	2.22	±0.55	9.06	±0.52	82.04	±6.56	16.24	±1.68	5.59	±0.37	12.24	±1.14	386.00	±15.00	48.62	±6.12	19.58	±0.98
353371	1	1.89	±0.60	10.28	±0.95	82.04	±16.32	20.92	±2.56	9.47	±0.91	27.16	±2.96	541.00	±44.20	63.42	±10.02	19.46	±1.84
353372	1	1.75	±0.53	11.39	±0.98	108.60	±18.38	17.04	±2.28	13.08	±1.09	13.80	±2.24	84.64	±7.02	225.20	±22.20	21.05	±1.77
353386	1	2.45	±0.51	1.79	±0.19	10.66	±2.64	14.36	±1.52	2.24	±0.20	11.56	±1.70	8.81	±1.58	111.98	±15.88	26.84	±1.68
353352	2	1.63	±0.40	14.98	±1.02	108.22	±9.31	63.42	±4.42	19.42	±1.27	28.78	±2.18	1068.00	±62.20	135.68	±11.86	17.27	±1.17
353353	2	1.98	±0.44	8.14	±0.51	71.12	±2.91	25.70	±2.36	6.48	±0.45	16.74	±1.82	48.00	±3.18	123.32	±15.12	17.62	±1.05
353354	2	1.47	±0.43	6.28	±0.38	42.44	±3.16	19.80	±1.94	5.56	±0.35	11.53	±2.18	850.60	±38.60	53.82	±12.88	13.10	±0.76
353355	2	2.13	±0.58	5.92	±0.40	39.70	±1.46	18.94	±1.82	4.00	±0.33	10.78	±1.42	1918.60	±95.40	44.36	±14.08	14.82	±0.99
353387	3	0.95	±0.23	11.34	±0.42	99.06	±2.47	66.18	±2.66	15.33	±0.51	50.62	±2.64	49.22	±2.22	66.26	±9.38	11.51	±0.52
353388	3	0.82	±0.22	9.02	±0.39	75.54	±2.69	20.40	±1.36	8.67	±0.36	14.60	±1.30	69.38	±3.02	65.46	±12.74	10.38	±0.55
353390	3	0.93	±0.24	4.44	±0.28	35.66	±1.51	9.70	±1.00	3.92	±0.27	14.44	±12.55	45.18	±2.98	47.56	±6.68	7.92	±0.51
353392	3	2.07	±0.61	11.84	±0.84	92.50	±7.10	34.12	±4.18	5.31	±0.45	21.94	±3.24	131.30	±9.00	88.14	±29.70	23.12	±1.60
353393	3	1.58	±0.41	2.70	±0.21	27.68	±1.45	11.31	±1.20	2.54	±0.25	6.83	±1.31	692.80	±35.60	58.96	±30.32	12.55	±0.76
353394	3	2.98	±0.74	3.83	±0.31	48.78	±1.99	16.70	±1.88	3.30	±0.28	10.83	±1.17	3896.00	±212.00	58.88	±16.16	20.02	±1.40
353356	4	1.70	±0.40	7.21	±0.41	69.22	±2.73	23.68	±1.94	8.24	±0.41	13.49	±1.14	480.40	±17.80	61.94	±7.60	14.96	±0.75
353357	4	0.97	±0.19	0.59	±0.05	3.46	±0.08	6.16	±0.50	0.97	±0.07	4.86	±0.73	4.05	±0.72	33.14	±4.76	9.60	±0.32
353358	4	2.76	±0.72	10.92	±0.70	91.58	±2.66	37.56	±3.50	11.00	±0.72	24.62	±5.10	880.20	±46.40	99.80	±21.80	25.82	±1.58
353359	4	1.55	±0.42	11.23	±0.65	85.88	±30.46	40.28	±2.90	8.71	±0.51	22.72	±2.56	4270.00	±182.00	51.88	±9.14	15.47	±0.85
353360	4	1.27	±0.41	6.05	±0.47	57.48	±8.39	18.20	±1.88	7.83	±0.55	13.70	±1.62	7550.00	±390.00	43.96	±7.08	14.22	±0.90
353361	4	1.33	±0.36	10.15	±0.47	85.70	±3.69	25.46	±1.88	5.72	±0.33	14.56	±1.32	36.76	±1.90	33.46	±5.14	14.87	±0.82
353375	4	1.43	±0.39	8.26	±0.46	66.62	±3.86	23.04	±1.80	7.34	±0.41	13.46	±1.29	283.10	±12.42	93.74	±20.92	12.26	±0.70
353381	4	2.54	±0.72	12.10	±0.83	112.22	±2.95	28.14	±2.98	14.92	±0.93	24.82	±3.72	103.54	±6.78	175.60	±26.20	23.90	±1.56
353384	4	2.25	±0.66	15.53	±0.69	149.84	±4.33	42.28	±3.46	12.55	±0.63	28.84	±2.60	12.32	±1.80	98.28	±12.64	21.03	±1.09
353385	4	1.64	±0.52	15.62	±1.07	138.84	±10.34	45.88	±4.64	19.43	±1.36	34.06	±2.90	16.80	±1.58	109.20	±22.60	19.58	±1.42

Table A2. 4 continued: Trace Element composition of Samples from Centinela district. Values are in ppm. Uncertainty is 2 standard error.

Sample	Session	72 Ge		75 As		77 Se		85 Rb		88 Sr		89 Y		90 Zr		93 Nb		95 Mo	
353362	1	1.43	±0.40	5.34	±0.55	b.l.d.		54.26	±2.34	403.20	±15.80	7.56	±0.38	103.56	±4.30	6.37	±0.36	1.78	±0.18
353363	1	1.47	±0.41	4.47	±0.57	b.l.d.		49.46	±1.76	702.80	±21.80	13.30	±0.56	152.36	±5.04	7.36	±0.35	1.67	±0.20
353364	1	1.84	±0.56	7.44	±0.77	1.40	±1.20	53.12	±2.14	651.00	±22.00	13.48	±0.58	160.22	±5.82	7.52	±0.42	2.55	±0.25
353367	1	1.73	±0.48	4.75	±0.72	2.70	±1.50	68.96	±3.92	627.00	±32.60	12.73	±0.79	140.72	±7.80	6.58	±0.46	1.61	±0.22
353368	1	1.62	±0.61	4.46	±0.71	b.l.d.		61.72	±2.22	669.00	±20.80	12.34	±0.49	156.52	±5.24	6.65	±0.33	2.67	±0.25
353369	1	2.21	±0.53	5.19	±0.69	2.25	±1.45	107.52	±5.90	617.40	±32.00	12.18	±0.73	141.08	±7.36	7.27	±0.47	10.43	±0.73
353370	1	1.65	±0.53	4.27	±0.60	b.l.d.		64.96	±2.32	405.58	±13.46	11.26	±0.54	136.98	±4.38	6.62	±0.35	1.47	±0.17
353371	1	1.85	±0.44	4.35	±0.69	b.l.d.		39.68	±3.28	561.40	±46.00	9.47	±0.81	135.28	±10.88	6.82	±0.62	3.13	±0.39
353372	1	1.62	±0.56	9.53	±1.14	b.l.d.		66.44	±4.72	940.80	±62.40	14.42	±1.06	146.70	±9.70	7.04	±0.58	3.55	±0.39
353386	1	1.26	±0.32	2.29	±0.42	b.l.d.		40.68	±2.16	932.20	±45.40	93.94	±4.80	469.80	±23.60	9.51	±0.56	0.44	±0.08
353352	2	1.83	±0.36	3.18	±0.46	b.l.d.		125.86	±7.58	244.16	±13.96	12.19	±0.78	111.04	±7.10	5.56	±0.37	2.78	±0.26
353353	2	1.76	±0.35	3.12	±0.42	b.l.d.		53.16	±2.78	411.20	±20.80	12.67	±0.73	133.68	±7.02	6.24	±0.38	2.64	±0.23
353354	2	1.67	±0.45	4.17	±0.54	b.l.d.		91.20	±4.10	352.60	±15.80	10.81	±0.57	126.54	±5.64	6.05	±0.33	4.74	±0.36
353355	2	1.70	±0.37	4.27	±0.54	b.l.d.		92.90	±4.82	378.00	±19.00	10.40	±0.58	133.46	±7.10	7.70	±0.50	3.57	±0.29
353387	3	0.72	±0.20	12.88	±0.65	0.97	±0.61	15.77	±0.57	700.20	±19.00	10.14	±0.35	78.76	±2.20	4.55	±0.19	1.26	±0.11
353388	3	0.97	±0.18	8.00	±0.55	b.l.d.		24.90	±0.98	480.00	±16.80	7.78	±0.36	71.26	±2.44	2.70	±0.15	1.01	±0.10
353390	3	0.92	±0.21	2.41	±0.31	b.l.d.		70.82	±3.34	181.70	±8.38	9.51	±0.50	120.24	±5.68	4.29	±0.25	0.87	±0.12
353392	3	2.23	±0.54	7.48	±0.79	b.l.d.		167.44	±10.34	370.00	±22.00	13.67	±0.93	196.60	±12.00	7.69	±0.55	1.45	±0.21
353393	3	2.03	±0.39	2.25	±0.35	b.l.d.		80.52	±3.56	333.00	±14.80	3.35	±0.22	77.74	±3.52	3.20	±0.23	56.00	±2.54
353394	3	4.98	±0.61	3.55	±0.55	b.l.d.		154.22	±8.26	339.40	±18.40	4.87	±0.34	123.00	±6.68	4.36	±0.29	275.80	±15.20
353356	4	0.90	±0.35	3.20	±0.42	1.40	±1.10	56.36	±2.06	401.00	±13.80	8.58	±0.37	114.20	±3.98	5.29	±0.27	5.94	±0.32
353357	4	0.70	±0.11	1.01	±0.12	0.57	±0.38	14.54	±0.39	326.60	±7.84	32.31	±0.79	163.00	±4.02	3.30	±0.11	0.25	±0.03
353358	4	1.90	±0.50	4.58	±0.59	2.00	±1.60	109.92	±5.44	534.40	±25.60	15.34	±0.93	182.32	±9.68	9.35	±0.55	5.19	±0.42
353359	4	1.99	±0.35	4.63	±0.48	b.l.d.		88.58	±3.76	405.62	±17.14	11.10	±0.56	119.36	±4.92	5.22	±0.31	2.52	±0.23
353360	4	1.50	±0.45	3.96	±0.52	b.l.d.		78.22	±4.22	313.16	±15.78	38.30	±2.00	111.70	±5.94	4.96	±0.33	55.04	±3.10
353361	4	1.36	±0.27	2.89	±0.37	b.l.d.		57.00	±2.06	411.40	±14.40	11.87	±0.49	68.54	±2.64	4.73	±0.23	0.92	±0.12
353375	4	1.11	±0.33	2.60	±0.38	1.69	±0.96	57.86	±2.66	191.44	±8.50	9.32	±0.45	107.96	±4.64	4.79	±0.28	4.03	±0.27
353381	4	2.00	±0.55	5.46	±0.70	b.l.d.		63.64	±3.32	763.40	±37.80	13.97	±0.80	175.98	±8.96	7.96	±0.49	8.32	±0.67
353384	4	1.68	±0.49	8.40	±0.72	b.l.d.		71.58	±2.72	703.00	±24.40	16.30	±0.70	167.44	±6.06	7.96	±0.40	1.84	±0.21
353385	4	1.41	±0.40	4.29	±0.53	3.00	±1.40	68.42	±4.08	637.20	±36.60	16.84	±1.11	198.26	±11.80	6.75	±0.47	2.07	±0.24

b.l.d.: Below limits of detection

Table A2. 4 continued: Trace Element composition of Samples from Centinela district. Values are in ppm. Uncertainty is 2 standard error.

Sample	Session	107 Ag		111 Cd		115 In		118 Sn		121 Sb		125 Te		133 Cs		139 La		140 Ce	
353362	1	0.21	±0.04	b.l.d.		0.03	±0.02	1.44	±0.19	0.41	±0.11	0.36	±0.23	1.72	±0.14	14.23	±0.64	25.37	±1.11
353363	1	0.05	±0.03	b.l.d.		b.l.d.		1.44	±0.23	0.30	±0.10	0.21	±0.20	1.97	±0.15	18.70	±0.68	36.28	±1.26
353364	1	0.08	±0.03	b.l.d.		0.05	±0.02	1.53	±0.23	0.56	±0.16	0.26	±0.21	3.14	±0.24	22.17	±0.90	41.32	±1.54
353367	1	0.14	±0.04	b.l.d.		0.04	±0.02	2.10	±0.62	0.37	±0.13	0.18	±0.19	4.21	±0.32	18.21	±1.01	35.06	±2.04
353368	1	0.23	±0.05	b.l.d.		0.04	±0.02	2.01	±0.25	0.56	±0.18	0.19	±0.20	2.56	±0.20	17.02	±0.67	32.14	±1.07
353369	1	0.49	±0.08	b.l.d.		0.04	±0.02	3.51	±0.36	0.51	±0.13	0.21	±0.21	4.30	±0.33	14.92	±0.86	27.32	±1.54
353370	1	0.13	±0.03	0.33	±0.26	0.03	±0.02	1.53	±0.20	0.41	±0.13	0.22	±0.20	9.52	±0.47	18.93	±0.76	34.38	±1.24
353371	1	0.22	±0.05	b.l.d.		0.03	±0.02	1.24	±0.24	0.31	±0.12	0.06	±0.16	1.46	±0.20	13.02	±1.11	23.80	±2.06
353372	1	0.31	±0.05	0.61	±0.30	0.10	±0.03	1.50	±0.26	1.15	±0.19	0.23	±0.22	1.91	±0.20	20.39	±1.47	38.46	±2.74
353386	1	0.07	±0.03	b.l.d.		0.06	±0.02	5.46	±0.38	0.21	±0.07	0.11	±0.16	1.03	±0.10	47.22	±2.40	94.32	±4.68
353352	2	0.37	±0.06	0.39	±0.19	0.11	±0.04	3.89	±0.33	0.41	±0.08	0.05	±0.13	6.24	±0.42	10.09	±0.64	18.23	±1.13
353353	2	0.07	±0.04	1.36	±0.36	0.03	±0.01	2.20	±0.23	0.27	±0.07	0.13	±0.17	2.46	±0.19	18.31	±1.01	32.46	±1.68
353354	2	0.42	±0.05	0.19	±0.19	0.02	±0.01	0.95	±0.17	0.38	±0.08	0.11	±0.17	3.49	±0.23	19.69	±0.93	35.80	±1.66
353355	2	0.54	±0.08	b.l.d.		0.04	±0.02	1.58	±0.20	0.29	±0.08	0.09	±0.18	2.58	±0.21	19.88	±1.08	35.22	±1.94
353387	3	0.05	±0.02	0.18	±0.10	0.03	±0.01	0.95	±0.14	0.56	±0.06	0.07	±0.14	0.80	±0.06	20.47	±0.60	37.25	±1.09
353388	3	0.07	±0.02	0.10	±0.10	0.10	±0.04	0.82	±0.12	0.64	±0.08	0.11	±0.17	0.86	±0.06	8.27	±0.35	15.81	±0.57
353390	3	0.07	±0.03	0.11	±0.09	0.04	±0.02	0.68	±0.24	0.24	±0.05	0.17	±0.18	1.30	±0.10	14.45	±0.74	26.76	±1.29
353392	3	0.21	±0.14	0.19	±0.20	0.07	±0.06	2.79	±0.38	0.41	±0.12	0.11	±0.16	5.13	±0.41	22.22	±1.38	39.90	±2.62
353393	3	0.24	±0.04	b.l.d.		0.03	±0.02	0.88	±0.13	0.42	±0.08	0.15	±0.19	0.78	±0.08	11.28	±0.56	21.62	±0.96
353394	3	0.79	±0.09	0.22	±0.19	0.05	±0.02	1.83	±0.22	0.21	±0.08	0.10	±0.17	1.13	±0.12	15.51	±0.90	30.56	±1.66
353356	4	0.17	±0.04	0.20	±0.15	0.05	±0.02	1.62	±0.19	0.30	±0.09	0.08	±0.16	1.95	±0.15	15.61	±0.62	28.23	±1.03
353357	4	0.03	±0.01	0.08	±0.06	0.02	±0.01	1.95	±0.12	0.13	±0.02	0.09	±0.16	0.40	±0.03	16.61	±0.44	32.69	±0.88
353358	4	0.23	±0.06	0.26	±0.21	0.05	±0.02	2.83	±0.30	0.52	±0.14	0.16	±0.19	3.80	±0.29	13.09	±0.75	24.08	±1.28
353359	4	1.29	±0.10	0.22	±0.15	0.13	±0.03	2.49	±0.24	0.21	±0.07	0.02	±0.14	3.62	±0.24	14.64	±0.67	26.97	±1.23
353360	4	0.67	±0.08	0.23	±0.18	0.16	±0.03	3.38	±0.31	0.34	±0.11	0.28	±0.24	3.64	±0.27	24.87	±1.37	47.66	±2.50
353361	4	0.05	±0.02	b.l.d.		0.02	±0.01	1.97	±0.17	0.21	±0.06	0.10	±0.18	1.89	±0.13	11.96	±0.49	22.48	±0.86
353375	4	0.20	±0.04	0.28	±0.18	0.06	±0.02	2.37	±0.21	0.61	±0.10	0.34	±0.24	2.71	±0.19	13.13	±0.61	23.96	±1.03
353381	4	0.14	±0.05	b.l.d.		0.08	±0.03	2.66	±0.31	0.84	±0.15	0.22	±0.23	2.03	±0.20	18.26	±1.00	33.30	±1.68
353384	4	0.13	±0.04	b.l.d.		0.08	±0.03	1.48	±0.18	1.05	±0.16	0.27	±0.24	1.44	±0.13	31.06	±1.15	55.80	±2.04
353385	4	0.13	±0.04	0.27	±0.25	0.04	±0.02	1.66	±0.24	0.30	±0.09	0.16	±0.18	3.41	±0.28	28.62	±1.80	54.56	±3.28

b.l.d.: Below limits of detection

Table A2. 4 continued: Trace Element composition of Samples from Centinela district. Values are in ppm. Uncertainty is 2 standard error.

Sample	Session	141 Pr		146 Nd		147 Sm		153 Eu		157 Gd		159 Tb		163 Dy		165 Ho		166 Er	
353362	1	2.74	±0.19	10.65	±0.77	1.83	±0.28	0.55	±0.07	1.61	±0.26	0.21	±0.04	1.25	±0.18	0.25	±0.04	0.72	±0.11
353363	1	4.29	±0.21	17.99	±0.99	3.71	±0.45	1.05	±0.12	2.77	±0.37	0.42	±0.05	2.32	±0.25	0.46	±0.05	1.25	±0.17
353364	1	4.71	±0.23	19.18	±1.24	3.63	±0.44	1.14	±0.14	3.06	±0.40	0.43	±0.06	2.40	±0.27	0.48	±0.07	1.32	±0.18
353367	1	4.07	±0.31	16.96	±1.31	3.47	±0.46	1.01	±0.14	2.70	±0.41	0.43	±0.06	2.41	±0.29	0.47	±0.07	1.27	±0.18
353368	1	3.74	±0.20	15.88	±1.04	3.25	±0.43	1.00	±0.13	2.80	±0.37	0.37	±0.05	2.30	±0.25	0.43	±0.06	1.23	±0.17
353369	1	3.14	±0.22	13.37	±1.04	2.46	±0.41	0.94	±0.13	2.39	±0.37	0.31	±0.05	1.97	±0.27	0.44	±0.06	1.26	±0.18
353370	1	3.87	±0.20	15.61	±0.94	2.94	±0.38	0.91	±0.11	2.57	±0.33	0.35	±0.05	1.92	±0.23	0.37	±0.05	1.07	±0.15
353371	1	2.70	±0.26	11.51	±1.26	2.32	±0.41	0.76	±0.12	2.08	±0.39	0.28	±0.05	1.59	±0.26	0.35	±0.06	0.91	±0.15
353372	1	4.48	±0.37	18.46	±1.62	3.80	±0.53	1.04	±0.15	3.18	±0.47	0.45	±0.07	2.65	±0.34	0.53	±0.08	1.47	±0.20
353386	1	11.18	±0.60	46.46	±2.64	10.08	±0.78	1.58	±0.15	11.46	±0.85	2.13	±0.16	14.90	±0.94	3.49	±0.22	11.16	±0.74
353352	2	2.08	±0.15	8.92	±0.74	1.97	±0.24	0.58	±0.07	2.06	±0.29	0.33	±0.04	2.03	±0.22	0.43	±0.05	1.23	±0.13
353353	2	3.65	±0.23	14.94	±0.97	2.79	±0.33	0.79	±0.08	2.48	±0.28	0.36	±0.04	2.12	±0.23	0.42	±0.05	1.18	±0.13
353354	2	3.91	±0.22	15.18	±0.97	2.68	±0.30	0.62	±0.08	2.30	±0.29	0.30	±0.04	1.97	±0.21	0.38	±0.05	1.06	±0.12
353355	2	3.81	±0.25	15.07	±0.98	2.74	±0.38	0.68	±0.09	2.25	±0.33	0.31	±0.05	1.75	±0.22	0.34	±0.05	1.05	±0.14
353387	3	4.49	±0.16	19.79	±0.79	3.59	±0.29	0.98	±0.08	2.81	±0.24	0.35	±0.03	2.01	±0.16	0.37	±0.03	1.04	±0.09
353388	3	1.91	±0.11	8.79	±0.52	1.87	±0.21	0.56	±0.06	1.66	±0.19	0.24	±0.03	1.48	±0.14	0.28	±0.03	0.77	±0.08
353390	3	2.97	±0.17	12.18	±0.74	2.19	±0.24	0.44	±0.05	1.92	±0.21	0.27	±0.03	1.72	±0.17	0.33	±0.03	0.96	±0.10
353392	3	4.46	±0.34	17.50	±1.38	3.26	±0.47	0.82	±0.11	2.75	±0.41	0.38	±0.06	2.54	±0.31	0.47	±0.06	1.42	±0.20
353393	3	2.44	±0.16	9.66	±0.63	1.54	±0.23	0.43	±0.06	1.00	±0.16	0.13	±0.02	0.64	±0.11	0.11	±0.02	0.32	±0.06
353394	3	3.51	±0.23	14.20	±1.04	2.27	±0.34	0.65	±0.09	1.54	±0.25	0.18	±0.03	0.97	±0.16	0.17	±0.03	0.44	±0.09
353356	4	3.23	±0.17	13.22	±0.77	2.56	±0.30	0.67	±0.08	2.10	±0.26	0.28	±0.04	1.59	±0.17	0.33	±0.04	0.86	±0.11
353357	4	3.88	±0.13	16.20	±0.55	3.58	±0.22	0.56	±0.04	4.00	±0.23	0.71	±0.04	5.22	±0.22	1.21	±0.06	3.93	±0.18
353358	4	2.91	±0.20	12.43	±0.96	2.76	±0.38	0.73	±0.10	2.64	±0.37	0.40	±0.06	2.42	±0.27	0.48	±0.06	1.46	±0.18
353359	4	3.08	±0.17	12.88	±0.82	2.53	±0.35	0.66	±0.08	2.46	±0.29	0.33	±0.04	1.94	±0.21	0.40	±0.05	0.99	±0.12
353360	4	5.55	±0.35	23.58	±1.44	5.39	±0.56	0.82	±0.10	5.61	±0.53	0.92	±0.09	6.10	±0.50	1.21	±0.11	3.58	±0.34
353361	4	2.71	±0.14	11.80	±0.65	2.42	±0.25	0.64	±0.08	2.30	±0.26	0.33	±0.03	2.14	±0.18	0.41	±0.04	1.22	±0.13
353375	4	2.72	±0.16	10.97	±0.66	2.26	±0.27	0.60	±0.07	1.87	±0.23	0.30	±0.04	1.76	±0.19	0.33	±0.04	0.98	±0.12
353381	4	4.13	±0.26	17.56	±1.30	3.53	±0.47	0.98	±0.13	3.19	±0.45	0.44	±0.06	2.63	±0.29	0.50	±0.07	1.38	±0.19
353384	4	6.20	±0.31	25.98	±1.48	4.43	±0.46	1.24	±0.13	4.00	±0.44	0.53	±0.06	2.96	±0.29	0.60	±0.07	1.63	±0.17
353385	4	6.31	±0.41	27.04	±1.98	5.12	±0.59	1.36	±0.15	4.29	±0.45	0.58	±0.07	3.28	±0.35	0.61	±0.06	1.58	±0.18

Table A2. 4 continued: Trace Element composition of Samples from Centinela district. Values are in ppm. Uncertainty is 2 standard error.

Sample	Session	169 Tm		172 Yb		175 Lu		178 Hf		181 Ta		182 W		205 Tl		208 Pb		209 Bi	
353362	1	0.11	±0.02	0.87	±0.15	0.14	±0.03	3.09	±0.27	0.84	±0.08	3.39	±0.32	0.19	±0.04	10.23	±0.56	0.15	±0.02
353363	1	0.19	±0.04	1.27	±0.20	0.19	±0.04	4.11	±0.34	0.68	±0.07	4.38	±0.34	0.13	±0.04	7.45	±0.45	0.03	±0.01
353364	1	0.19	±0.04	1.27	±0.19	0.21	±0.04	4.42	±0.37	0.79	±0.08	3.75	±0.39	0.12	±0.04	7.24	±0.48	0.09	±0.03
353367	1	0.19	±0.03	1.25	±0.21	0.20	±0.04	3.83	±0.41	0.62	±0.08	5.51	±0.56	0.18	±0.05	10.29	±0.79	0.05	±0.02
353368	1	0.17	±0.03	1.23	±0.22	0.19	±0.04	4.13	±0.35	0.67	±0.08	6.01	±0.50	0.20	±0.05	6.95	±0.46	0.08	±0.04
353369	1	0.18	±0.04	1.28	±0.21	0.21	±0.04	3.81	±0.38	0.78	±0.09	5.70	±0.53	0.35	±0.08	6.77	±0.51	0.22	±0.04
353370	1	0.14	±0.03	1.13	±0.19	0.18	±0.04	3.87	±0.34	0.73	±0.07	5.01	±0.42	0.23	±0.05	10.40	±0.64	0.06	±0.02
353371	1	0.13	±0.03	1.03	±0.22	0.17	±0.04	3.75	±0.46	0.63	±0.09	3.60	±0.48	0.09	±0.04	9.37	±0.92	0.12	±0.03
353372	1	0.23	±0.04	1.50	±0.24	0.21	±0.04	4.08	±0.46	0.74	±0.09	6.96	±0.71	0.13	±0.05	37.92	±2.64	0.09	±0.03
353386	1	1.71	±0.13	11.92	±0.75	1.67	±0.13	9.28	±0.65	0.68	±0.07	2.12	±0.24	b.l.d.		7.67	±0.70	0.03	±0.01
353352	2	0.18	±0.03	1.33	±0.18	0.20	±0.03	3.21	±0.29	0.52	±0.06	8.52	±0.63	0.53	±0.07	27.90	±1.84	0.11	±0.02
353353	2	0.17	±0.03	1.15	±0.16	0.19	±0.03	3.70	±0.28	0.71	±0.07	9.34	±0.65	0.25	±0.05	15.37	±0.93	0.05	±0.02
353354	2	0.17	±0.03	1.21	±0.17	0.18	±0.03	3.68	±0.30	0.71	±0.07	8.06	±0.51	0.30	±0.06	15.93	±1.02	0.20	±0.03
353355	2	0.16	±0.03	1.10	±0.18	0.17	±0.03	3.87	±0.34	0.86	±0.08	10.90	±0.80	0.26	±0.06	10.37	±0.77	0.07	±0.02
353387	3	0.14	±0.02	0.89	±0.10	0.13	±0.02	2.10	±0.16	0.34	±0.03	3.70	±0.23	0.07	±0.02	8.38	±0.52	0.02	±0.01
353388	3	0.12	±0.02	0.73	±0.10	0.11	±0.02	1.89	±0.16	0.26	±0.03	3.71	±0.26	0.14	±0.03	11.44	±0.63	0.05	±0.01
353390	3	0.15	±0.02	1.03	±0.12	0.15	±0.02	3.34	±0.26	0.45	±0.04	3.30	±0.25	0.06	±0.02	9.54	±0.79	0.03	±0.01
353392	3	0.23	±0.04	1.57	±0.23	0.24	±0.05	5.57	±0.56	0.86	±0.09	11.96	±1.00	0.57	±0.10	16.64	±1.38	0.09	±0.03
353393	3	0.04	±0.01	0.30	±0.07	0.04	±0.01	2.19	±0.22	0.26	±0.03	14.54	±0.82	0.17	±0.04	7.65	±0.54	0.14	±0.03
353394	3	0.07	±0.02	0.45	±0.10	0.07	±0.02	3.48	±0.34	0.41	±0.05	136.38	±7.44	0.26	±0.06	9.85	±0.64	0.77	±0.07
353356	4	0.13	±0.02	0.92	±0.14	0.13	±0.02	3.20	±0.26	0.54	±0.05	7.90	±0.47	0.21	±0.04	12.04	±0.67	0.12	±0.02
353357	4	0.59	±0.03	4.20	±0.21	0.58	±0.03	3.21	±0.15	0.23	±0.02	1.64	±0.11	0.02	±0.01	3.19	±0.16	0.04	±0.02
353358	4	0.22	±0.04	1.56	±0.23	0.25	±0.04	5.24	±0.43	0.94	±0.10	11.03	±0.77	0.50	±0.09	22.46	±1.48	0.11	±0.02
353359	4	0.15	±0.02	1.05	±0.14	0.17	±0.03	3.45	±0.29	0.54	±0.05	13.47	±0.76	0.32	±0.06	9.16	±0.62	0.09	±0.02
353360	4	0.51	±0.06	3.51	±0.35	0.52	±0.06	3.41	±0.33	0.68	±0.07	6.72	±0.54	0.37	±0.06	14.40	±0.86	0.17	±0.03
353361	4	0.16	±0.03	1.16	±0.14	0.16	±0.02	1.93	±0.16	0.40	±0.04	9.26	±0.55	0.18	±0.04	9.49	±0.59	0.02	±0.01
353375	4	0.14	±0.02	1.03	±0.14	0.15	±0.03	3.00	±0.23	0.52	±0.05	6.17	±0.41	0.37	±0.06	13.61	±0.90	0.11	±0.03
353381	4	0.20	±0.04	1.54	±0.22	0.23	±0.04	4.72	±0.45	0.79	±0.09	11.79	±0.91	0.29	±0.07	27.48	±1.70	0.26	±0.04
353384	4	0.24	±0.04	1.62	±0.20	0.24	±0.04	4.66	±0.37	0.80	±0.08	8.60	±0.59	0.26	±0.05	16.83	±0.93	0.10	±0.03
353385	4	0.23	±0.04	1.54	±0.21	0.23	±0.04	5.21	±0.44	0.61	±0.07	6.95	±0.64	0.13	±0.04	14.54	±1.60	0.04	±0.02

b.l.d.: Below limits of detection

Table A2. 4 continued: Trace Element composition of Samples from Centinela district. Values are in ppm. Uncertainty is 2 standard error.

Sample	Session	232 Th		238 U	
353362	1	8.30	±0.42	1.25	±0.10
353363	1	4.65	±0.25	1.12	±0.10
353364	1	5.58	±0.34	1.93	±0.14
353367	1	4.09	±0.32	0.95	±0.11
353368	1	4.33	±0.26	1.15	±0.10
353369	1	5.63	±0.38	1.08	±0.12
353370	1	5.51	±0.27	1.18	±0.11
353371	1	3.95	±0.36	0.77	±0.11
353372	1	5.68	±0.43	1.95	±0.19
353386	1	0.91	±0.09	0.58	±0.06
353352	2	5.08	±0.36	1.94	±0.16
353353	2	7.94	±0.46	2.00	±0.13
353354	2	9.04	±0.46	1.55	±0.12
353355	2	9.04	±0.48	1.74	±0.15
353387	3	3.41	±0.15	0.84	±0.06
353388	3	1.54	±0.09	0.43	±0.04
353390	3	6.95	±0.34	1.23	±0.09
353392	3	9.50	±0.71	2.37	±0.20
353393	3	2.22	±0.14	1.12	±0.09
353394	3	3.32	±0.23	1.74	±0.14
353356	4	6.07	±0.28	2.09	±0.13
353357	4	0.42	±0.03	0.25	±0.02
353358	4	9.50	±0.52	2.35	±0.18
353359	4	5.15	±0.27	1.23	±0.10
353360	4	7.85	±0.48	2.35	±0.17
353361	4	3.24	±0.17	0.83	±0.07
353375	4	5.46	±0.29	2.15	±0.13
353381	4	7.37	±0.47	2.22	±0.20
353384	4	10.74	±0.47	3.24	±0.20
353385	4	7.50	±0.48	2.03	±0.17